All tutorial files can also be downloaded from: **www.3dartistonline.com/files**

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3D Artist™

63

Inspiration for the 3D community

36 PAGES OF THE BEST 3D TRAINING

Think you know Maya & 3ds Max?

From bipeds to locomotives, our experts share their top animation tips

DISCOVER THE ART OF RIGGING

Wrap your head around rigging using our professional guide

Vue 2014: Why it's the tool for you

Create matte paintings using the latest software

Marvelous Designer 3

Enhance your virtual clothing skills using the same tools as Weta

EXPERT RENDERS IN 17 STEPS

Master the discipline of lighting using our professional mental ray workflow

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ISSUE 063
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Images modelled and textured by courtesy of Daniele Orsetti dayno.it

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Awesome mental ray renders
page 58

With the Disc

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Artist info

Iliya Atanasov

Professional portfolio site
www.pixelhunters.com

Country UAE

Software used Maya, mental ray, Fusion

We were so impressed with Iliya's shark cover for issue 56 that we got back in touch with the Pixelhunters artist to create this stunning mental ray render. Learn his workflow over on p58. Elsewhere in the mag we take a look at Vue, Marvelous Designer, 3ds Max, Marmoset Toolbag, CINEMA 4D, RayFire and much more!

> "Here we will discuss the process of lighting and rendering in mental ray, for images that will really burst off the pages of your portfolio"

Iliya Atanasov studio director and lead artist, Pixelhunters **Page 58**

Discover the art of digital matte painting Page 42

Welcome

to the magazine and 116 pages of amazing 3D

Hello and welcome to 3D Artist magazine! Lighting can make or break an image – it's an incredibly important part of a 3D artist's workflow, especially if you want to make your artwork pop off the page. As such, we had Iliya Atanasov discuss his mental ray workflow for this issue's stunning cover, starting on p58. You'll also find tutorials on Vue, Maya, 3ds Max and more! Also be sure to try out your 60-day trial of Caustic Visualizer for Maya, available with this issue.

Chris Deputy Editor

Every issue you can count on...

1. **Exclusively commissioned art**
2. Behind-the-scenes guides to images and fantastic artwork
3. **A CD packed full of creative goodness**
4. Interviews with inspirational artists
5. **Tips for studying 3D or getting work in the industry**
6. The chance to see your art in the mag!

This issue's team of expert artists...

Iliya Atanasov

When it comes to mental ray, Iliya Atanasov is a certified expert. Discover why starting on p58

Dark Hoffman

Matte painter on everything from *Thor* to *X-Men*, Dark discusses his workflow in the latest version of Vue

Sander Boerefijn

Marvelous Designer is one piece of kit making a big name for itself. Master the software yourself on p66

Jahirul Amin

This issue the tireless Jahirul created a Maya animation tutorial, finishing off his in-depth train series

Dave Scotland

Following up from last issue's tutorial on 3ds Max rigging, Dave reveals how to animate your biped character

Daniele Orsetti

Texture artist, modeller and groom TD at MPC, Daniele is also a MARI expert and reveals his workflow on p84

Anselm von Seherr-Thoss

Our simulation and particle expert Anselm casts his eye over RayFire and looks at how to splinter wood

Gary Abrehart

3D animator Gary reveals how to master constraints for animation using CINEMA 4D

Drea Horvath

Vue aficionado Drea reviews the latest release of Vue. Take a look at her findings over on p94

Jared Gorby

This issue arch-vis professional Jared takes a look at the features in the latest release of Lumion

Gavin Goulden

Irrational Games lead artist Gavin discusses how Marmoset Toolbag 2.0 enhances his workflow on p98

Digital-Tutors

The scholarly Digital-Tutors showcases its pipeline for 12 steps to better facial animation

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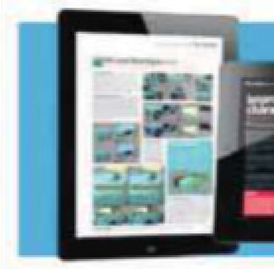
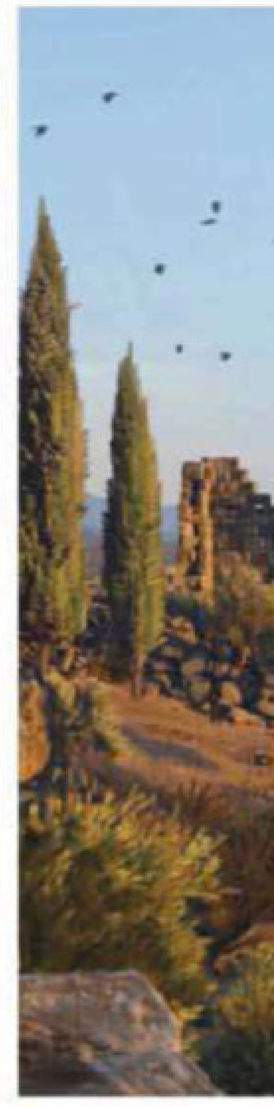
"Essentially, the rigger is placing the CG strings on the digital puppet"

Jahirul Amin, associate lecturer at NCCA **Page 32**





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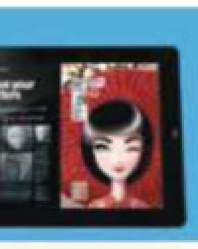

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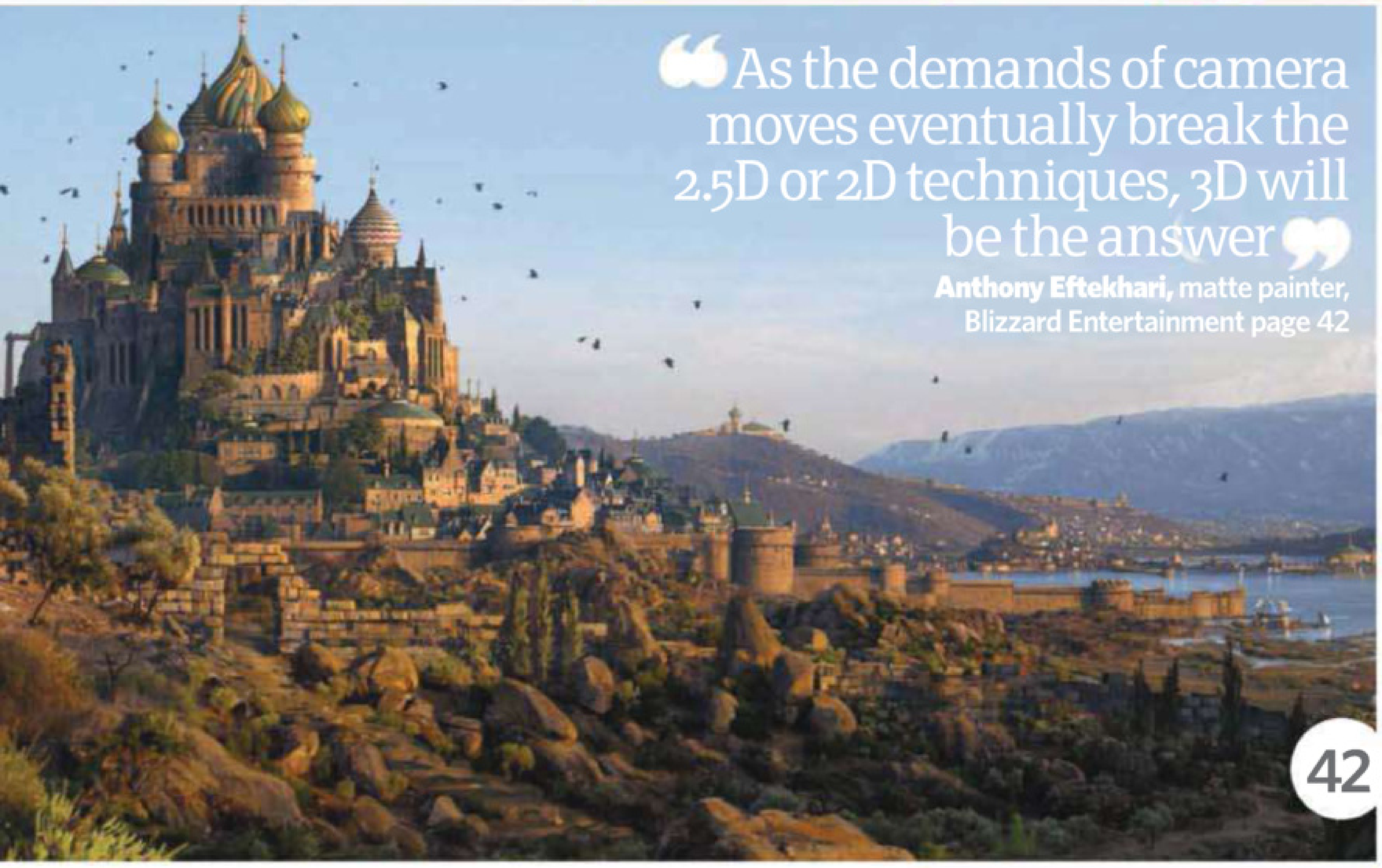

> As the demands of camera moves eventually break the 2.5D or 2D techniques, 3D will be the answer
>
> **Anthony Eftekhari,** matte painter, Blizzard Entertainment page 42

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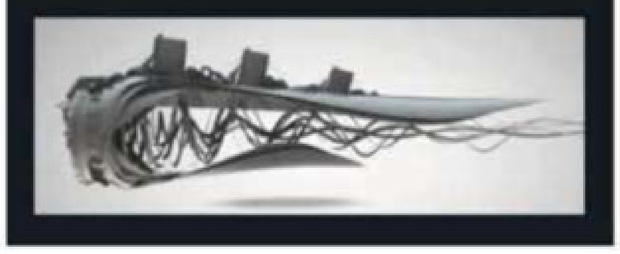

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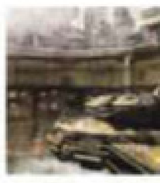

58 Step by step: Expert renders in 17 steps
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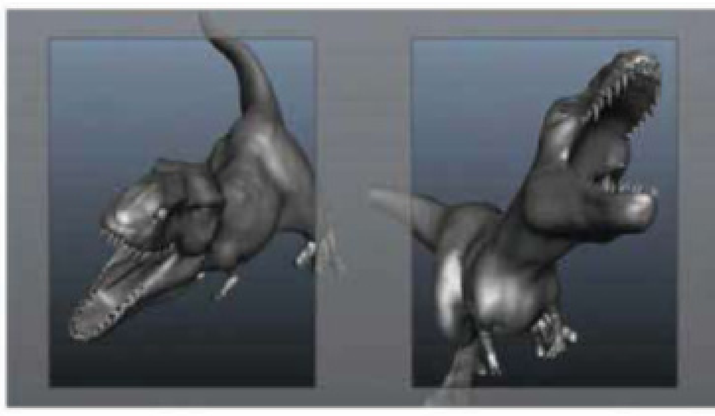

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Turn to page 112 for the complete list of the disc's contents

WELCOME TO

THE GALLERY

Seven pages of great artwork from the 3D community

Images we love!

We love how vibrant this image is. The minute you turn the page it immediately grabs your attention. Eye-catching stuff to say the least

Chris Deputy Editor

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“This image continues my series of work dedicated to my favourite CG software, which started with the Sphynx Cat featured in issue 44. Here the image is devoted to ZBrush, but I also learned a lot about the particle system in 3ds Max while working on it”

Pavel Kondratenko, *Blue Crab*, 2013

Artist info

Pavel Kondratenko

Pavel has worked in CG for four years, with experience in modelling, textures and shaders

Personal portfolio site www.texelstudio.com

Country Russia

Software used ZBrush, 3ds Max, V-Ray, Photoshop

Work in progress...

“Equilibrium was created with the idea that mechanical parts could form into a living, breathing life form. I tried to convey the innocence and vulnerability of a young girl in the piece”

Daniel Arnold-Mist,
Equilibrium, 2012

“The subtle power behind this character is incredible. We love Daniel's close attention to the shapes created by the negative spaces of the overall design”

Larissa Staff Writer

Artist info

Daniel Arnold-Mist

Daniel started creating 3D images when he was just 13 years old

Personal portfolio site
www.liquidminduk.cgsociety.org

Country China

Software used Maya, 3ds Max, V-Ray

Work in progress...

Artist info

Vladimir Kuzmin

3DArtist online

Username: Vladimir Kuzmin

Country Russia

Software used 3ds Max, Maxwell Render, Photoshop

> I painted the kitchen where I spent some years of my childhood. I remember the atmosphere of the kitchen, objects and furniture. A few families were living in our apartment and the kitchen was shared so such disorder was normal!
>
> **Vladimir Kuzmin,** *Back in the USSR, kitchen,* 2013

> Vladmir's 13 years of work in interior design are obvious considering the impeccable attention to detail in this image. What a beautiful glimpse into the past
>
> **Larissa** Staff Writer

Artist info

Koen Koopman

3DArtistonline

Username: TBKoen

Personal portfolio site
www.tubuh.nl

Country The Netherlands

Software used 3ds Max, Mudbox, After Effects, Photoshop, V-Ray

Work in progress...

"Colourful, brimming with character and a little bit slimy. That's just how we like our images on **3D Artist**! If they ever make a *Turbo 2*, we want this guy to be in it!"

Chris Deputy Editor

"This was an image I created for fun and practise, revised from an older version with my current knowledge of sculpting, lighting, colour palettes and composition"

Koen Koopman, *General Shellshock*, 2013

Artist info

Angel Navarro

A Spanish character artist living in Sweden, he has a passion for animation and characters

Personal portfolio site
www.angelnavarroart.com

Country Sweden

Software used MODO 701, ZBrush, Maya, Photoshop

Work in progress...

This image is just bursting with expression, from the models themselves, to the poses and the film-noir aesthetic

Chris Deputy Editor

This is a promotional poster for CTN Expo, featuring two of the characters, with a film-noir style. As a team we put this together for the webinars at VirtualAnimators.com. I was responsible for modelling, texturing, posing and rendering

Angel Navarro, *CTN Animation Expo Kirk & Lucy,* 2013

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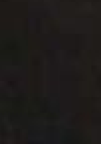


David has certainly injected realism into this creepy character, making him feel almost believable despite his scarred and alien features

Chris Deputy Editor

Artist info

David Munoz Velazquez

3DArtist online

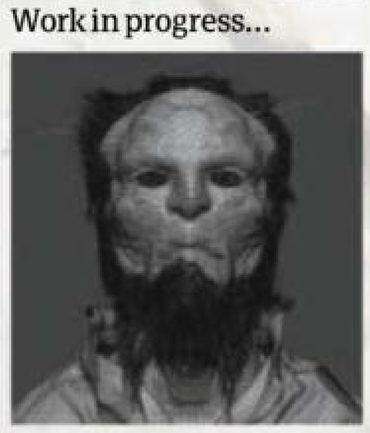
Username: munozvelazquez

Personal portfolio site
www.munozvelazquez.com

Country Spain

Software used ZBrush, Marvelous Designer, Photoshop

Work in progress...



I created this image as an exercise to try out new options for hair and rendering in ZBrush. I also wanted to see how a basic cloth simulation on a jacket would add more realism

David Munoz Velazquez,
Wrong Place Wrong Alien, 2013

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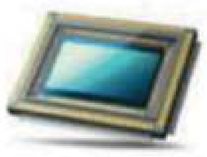

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Torso created with Autodesk 123D Catch at the London Printshow. 123D Catch was formally Project Photofly, and can be downloaded on the App Store

TOP The 123D Catch User Interface. The application allows users to capture anything in 3D using an iPad or iPhone

BOTTOM Any model created using the 123D applications and shared to the 123D Gallery can also be used for commercial purposes, entirely for free

Autodesk 123D

A look inside Autodesk's free apps for 3D printing

With 3D printing said to be the next industrial revolution and the industry forecast to experience approximately 20-25 per cent annual revenue growth in coming years, it is no surprise that computer graphics software giant Autodesk wants its own share of the action. What's unexpected is the result: a growing range of apps first launched three years ago that are now being further developed for 3D printing. Everything from sculpting creature designs to scanning an object for printing using just your phone is covered, and best of all, they are all absolutely free.

"I used to joke, 'Oh when are those 3D printers going to get here' because they didn't exist yet, and then when I moved to California and started working there they actually did exist. I realised that now I could physically design anything that I could imagine," begins Jesse Harrington, an Autodesk maker advocate who specialises in the family of applications, which Autodesk has dubbed Autodesk 123D. "How Autodesk is involved is the thought that we're only as good as the physical thing that comes out of that imagination, so that's our role – we think these apps should be something so helpful to your design process and not a hindrance, as software tended to be previously."

Impressively, he tells us that a lot of the 3D printed sculpts Autodesk had on display during the 3D Printshow in London were created using 123D Catch: an application that allows anyone with an iPhone, iPad or a web browser to create a 3D model for printing using just a set of photographs.

"Meanwhile, 123D Creature is more of a unique app because its kind of fun," Harrington continues. "You can play around and create these monsters and even bring them into Maya and make an animation with them. Then, you can send them out for a print from the app and it'll come back with a full-colour 3D print."

The other side to this is 123D Design, which is a more robust modelling program that users can also try out for free online. However, Harrington's favourite product is another called 123D Make. "It uses the same .stl file that I would use for anything for 3D printing and slices it up to whatever denomination I want," he explains. "So, if I want to make an eight-foot tall bookshelf I just download an .stl, and then say I want it to be eight feet tall and that my material is a quarter of an inch thick. The app will then gives me a pattern that I can cut out and then stick together, so we go from zero to bookshelf in under an hour, all ready to be printed."

Meshmixer

Autodesk's new addition to the 123D family of tools

Autodesk's Meshmixer, which the company has recently polished enough to add to the 123D family, is a free tool that does exactly what it says on the tin – mashing together meshes – though it also allows users to then prepare files for printing or fabrication. "You can take something from a design which is a very rigid shape and something from 123D Catch which is very fluid, then put them together with Meshmixer," says Harrington.

> "We think these apps should be helpful to your design process and not a hindrance, as software tended to be previously"
>
> **Jesse Harrington,** Autodesk Maker Advocate

Creativity and tech collide

FX TD Omar Meradi tells us more about his latest personal project, experimental short film 'Lead Me'

What inspired you to not only work as an FX TD but also complete personal films such as 'Lead Me'?

FX was the natural path I took at the end of my studies in CG at ATI; I felt comfortable using dynamics, fluids and procedural tools. I also liked lighting and compositing, but FX feels more unique to me.

There were a few goals for this project: I wanted to improve my skills and experiment new techniques, and also create something anybody could watch without being bound up with a scenario. I like to start with the technique, not the other way round.

Does your knowledge of working as an FX TD significantly help with your filmmaking?

Yes, it helped me a lot. FX is not just about adding smoke and little particles to an existing shot, it offers many more possibilities if you think of it as the main subject in the shot.

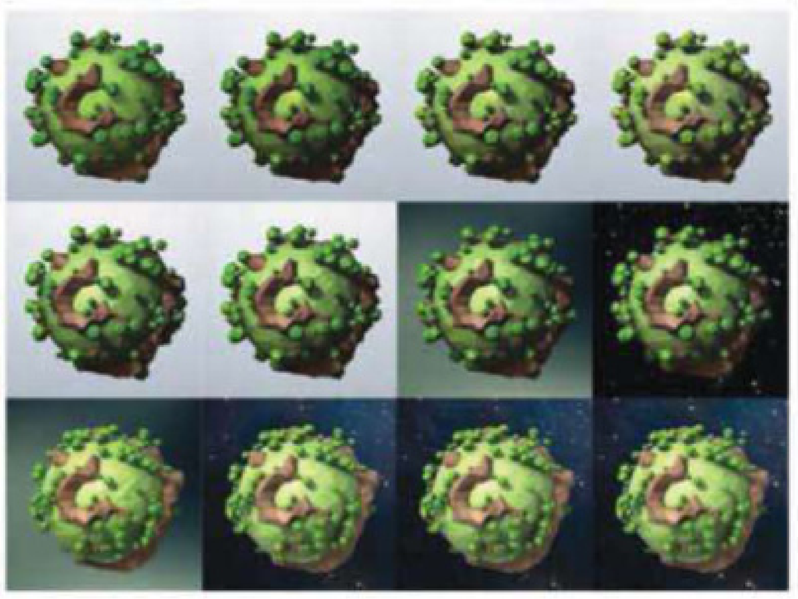
What were the main challenges and successes you faced when working on the film?

One of the main challenges was render time. I only had one PC to render and simulate everything; about three minutes of full CG. I kept render times low using motion blur and depth of field in post, baking any GI or final gather in mental ray, and having lots of different layers. I also tend to have lot of different scenes for one shot.

The hardest thing is that I had no dedicated time to work on it, only some weekends and holidays. The second year I had no time at all to make any progress, I was too busy. It ultimately took me about three years to finish it on my spare time.

"Keep it simple and learn the tools," advises Meradi to other filmmakers hoping to use CG within their projects. You can view the full short at tinyurl.com/3DALeadMe

Meradi used Maya, mental ray and After Effects to create 'Lead Me'. He also created tools in Python to help him with tasks such as populating instances over a scene, rigging and animating the monsters



The pros and cons of procedural animation

Leonardo Cavaletti reveals how he created his procedurally animated short, 'De Planeta', in only nine months

"I used an object generator plug-in, which was created via custom nodes and code in Houdini, that allowed me to randomly create geometry on my planet. This plug-in ended up growing more and more and I began to implement all the different options that ultimately allowed me to create the different timeline ages of the planet. I could choose what kind of object – such as trees or buildings – then I could choose the speed of generation of these objects and also the areas on the planet that they would be generated in," Cavaletti explains.

"Creating the animation procedurally allowed for a lot of fun during the development. It wasn't really stressful because I was almost playing with a videogame that let me create my own world. There was no specific plan because of the random nature of procedural animation; you just play around and see what comes out. I will probably use the plug-in for future projects because it doesn't only work with planets, you can connect it to anything and generate this procedural type of animation on any kind of surface."

You can view the short at tinyurl.com/3DADePlaneta

Side Effects also announced the release of the new experimental Houdini Engine plug-ins for public preview, enabling users to have access to Houdini technology inside Autodesk's Maya and the Unity Editor

The best of SIGGRAPH Asia

We take a look back at some of the top highlights from SIGGRAPH Asia 2013

KEYNOTE by Thad Starner

Keynote speaker and computing pioneer Thad Starner, who is a technical lead on Google's Glass project, explored the future of wearable technology and the increasingly interdependent relationship between humans and machines. We were also given a rare insight into the technologies and applications in wearable computing as well as exciting future projects such as Mobile Music Touch, a wireless glove that helps a wearer learn new piano melodies without needing to pay active attention; BrainSign, a Brain Computer Interface that attempts to recognise sign language by scanning the user's motor cortex; and FIDO, a tool that facilitates interactions between humans and guide dogs.

V-RAY 3 New features and imminent launch

The Chaos Group revealed some exciting live demos and presentations to preview V-Ray 3, which has been available for 3ds Max as a beta release since September. The new release of the lighting, shading and rendering toolkit is set to include improvements to speed, with everything demoed rendering at least two times faster and up to five times faster in Maya. The new release will also include a simplified user interface design and Progressive Production Rendering, a one-click action that allows artists to set up a scene in seconds.

RENDERMAN 18 New features and talk from Dylon Sisson

On the eve of SIGGRAPH Asia, Pixar Animation Studio announced the major release of RenderMan Studio 18, which includes new controls for lighting, geometric area lights and accelerated re-rendering powered by RenderMan's path tracer. Throughout the conference technical artist Dylan Sisson also gave a presentation demonstrating the new lighting and shading tools, showcasing the geometric area lights and path tracing. We were also treated to a screening of the *The Blue Umbrella* to see the new feature in action.

NVIDIA tech talks

Phillip Miller, director of advanced rendering product management at NVIDIA, talked about how the company has made physics-based rendering interactive. Companies such as Industrial Light & Magic and Disney's Pixar have been able to experiment with the lighting effects of different movies such as *Monsters University, Star Wars: The Clone Wars* and even the live action Disney's *Tron: Legacy* using Ira, a program that essentially mimics light within a physically rendered scene, ensuring that the lighting, shadows, reflections and refractions look photorealistic. Producing 4K content and the use of Web GL were also discussed.

AUTODESK tech talks

Autodesk also gave a number of presentations, such as Xsens Camera-less Motion Capture with Motion Builder, which explored applications of the Xsens MVN Inertial Mocap Suit – essentially a full-body, camera-less lycra suit solution that can be used either indoors or outdoors and requires minimal clean-up of captured data as there is no occlusion or marker swapping. Other presentations included an introduction into the new features and workflow of Autodesk Maya and Mudbox 2014, plus an introduction to Smoke video editing software for Mac and its tools for 3D compositing, colour correction and motion graphics, among others.

01 The first SIGGRAPH Asia conference was held in Singapore in 2008. It has been the second annual SIGGRAPH every year since

02 NVIDIA's tech talks saw the company showcase its technology being used in real world applications, as well as give step by step accounts of how it all worked

03 The first 100 people to the Pixar RenderMan sessions also got to bring home a complementary MU poster!

04 Both a conference and a trade exhibition, SIGGRAPH Asia 2013 saw local attendees interact with the international computer graphics community

3D Artist Reader Survey

Enter our **reader survey** to win **1 of 4 copies** of **MODO & MARI, worth £4,400!**

At 3D Artist we're always striving to bring you the best and most recent coverage that directly relates to the things *you* want to hear about. Whether it's movies, videogames, software releases, shorts, new technology, 3D printing or anything else that's even slightly CG related, we want to offer you access to the announcements and events you're most interested in hearing about.

That's why we're launching our most recent reader survey, so you can have your say on what content you want to see more of in the future. Whether that's an increased focus on a particular type of software or a CG discipline that you don't feel has received enough coverage, we want to know your thoughts on the mag and where it should go in the future.

To have your voice heard simply head to **www.3dartistonline.com/survey**, fill out the form and tell us what you want to see in the mag in the coming months.

Excitingly, everyone who completes the survey will also be entered into a competition, with a chance to win a free license of either The Foundry's MODO or MARI software!

We've got two copies of MARI and two copies of MODO to give away. All you need to do is simply enter the survey and let us know your thoughts on the mag, and you'll be in with a chance of winning one of these exciting and professional-grade tools.

Entry for the competition closes on 19 March 2014.

AYCO ALBUM COVER - Created with MARI © Chris Nichols
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MODO brings you the next generation of 3D modelling, animation, sculpting, effects and rendering in one powerful integrated package. An end-to-end solution delivering raw horsepower, refined technology and robust workflows, MODO is the creative option of choice for artists and designers around the world, from home-based hobbyists to Hollywood studios. It's a key tool in the arsenal of any artist looking for the complete package. **www.thefoundry.co.uk/products/modo/**

About MARI

The Foundry's cutting-edge 3D paint tool, MARI, offers a fluid and flexible way to paint directly onto 3D models, meaning more time spent painting and less time managing technical issues. Supported by an incredibly advanced layering system, MARI is capable of handling high-resolution textures and millions of polygons without ever compromising on speed or efficiency. It also provides a fully customisable user interface that lets you work just the way you want. **www.thefoundry.co.uk/products/mari/**

About The Foundry

The Foundry is a global developer of computer graphics, visual effects and 3D design software for the design, visualisation and entertainment industries. The workflows created by the company serve multiple industries, making creative tasks a walk in the park. The Foundry's portfolio is as creative as it is technical, packed full of groundbreaking and award-winning tech that will have even the most demanding organisation or one-man show salivating. **www.thefoundry.co.uk**

modo

MARI

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A

B

Images of the month

These are the illustrations that have been awarded Image of the Week' on 3DArtistOnline.com in the last month

Share your art
Register with us today at
3DArtist online .com
www.3dartistonline.com
to view the art and chat to the artists

A Armour
» **Donghoo Lee**
3DA username zetfree
Donghoo says: "This is a futuristic armour kit to be worn in battle. I wanted it to feel like a mechanical style of Minotaur. I used 3ds Max, ZBrush, KeyShot and Photoshop to create the image."
We say: *We love the combination of Greek mythology with sleek, futuristic sci-fi. This character exudes power, thanks to the bulky, hulking armour he's encased in and, of course, the massive weapon he's carrying!*

B Ladybug Journey
» **Nicolas Delille**
3DA username ModernAgeStudio
Nicolas says: "This was my attempt at photorealism. I wanted to put my ladybug in a nice environment, making for a sublime-looking image. It was created with CINEMA 4D, ZBrush and Photoshop."
We say: *Your attempt has more than succeeded, Nicolas! The detail here is absolutely fantastic – not the least the bump texture across the ladybird's body. Fantastic stuff! Be sure to keep an eye out for more of Nicolas' work in future issues of 3D Artist...*

C The Watcher on the Wall
» **Ken Fee**
3DA username Albanart
Ken says: "This was a character test piece, created using ZBrush and Photoshop. A sentry, this character is confident in her abilities to the point of arrogance, with the pose and facial expression all hopefully playing a part in conveying that."
We say: *Hope no longer Ken, as this image perfectly demonstrates the traits you listed. Her pose plays a large part in this, immediately telling the audience a lot about the character without her needing to utter a single word.*

D Dragon Slayer
» **Gabriele Maiocco**
3DA username gmaiocco
Gabriele says: "I created this image for a dragon-themed creature design challenge, using ZBrush and Photoshop. My goal was to make something different, less fearful and funnier. I wanted to make people smile."
We say: *We're definitely smiling! How could we not at the face of this creature? We love the tiny knight facing up against this squat little dragon too. A great image that shows CG doesn't have to be serious.*

C

lery

Warrior
» **Jon-Keun Kim**
3DA username jong
Jon says: "The aim of this project was to create a realistic character based on an inspiring piece of Dean Holdeen's concept art. I created the base geometry and UV mapping in Maya, then sculpted detail using Surface Noise in ZBrush. I used the BPR render with various materials."
We say: *We love Dean Holdeen's art, especially when we get to see it transposed into the world of 3D. This knight character is stunning, combining medieval, ancient Japanese and fantasy inspirations.*

Just A T-Rex
» **Jacob Roark**
3DA username jacobroark
Jacob says: "I've always loved dinosaurs and now with 3D I have the ability to crate my own and relive my childhood!"
We say: *A rather apt image, given this issue's cover! The detail across this tyrannosaur's skin is very well realised, as is its overall heft and musculature. Fantastic work, Jacob!*

Western Horse
» **NoneCG**
3DA username NONECG
NoneCG says: "This image was created for the promotion of the Animated Horses product available at NoneCG.com. The model features an advanced rig with animations, a full environment with pro studio lighting and render setup for mental ray. You can see more like it at **www.nonecg.com**."
We say: *This is a beautifully rendered horse image – the textures create a very tactile feel to the creature, and the pose immediately sells its raw power. Keep an eye out on future issues of* ***3D Artist*** *for some free sample models from NoneCG!*

Human Skull Study
» **John William Crossland**
3DA username Jwcorvus
John says: "This is a speed sculpt study of a human skull. It was made in ZBrush within an hour and rendered using mental ray. You can see more at **http://johnwcrossland.co.uk**."
We say: *Even without considering that this was sculpted in less than an hour, this is still an impressively crafted piece. The sense of proportion is excellent and we love the detailed cracks and scuffed textures.*

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Top tweets

Get involved... **@3DArtist**

@3DArtist Who's watched the new *Godzilla* trailer?

@LUCIN0275 Very cool trailer. The carnage is insane

@3DArtist Image of the Day today is *Fire Fighter Drone Concept* by Dmitriy Rabochiy! See more and WIP at **http://zxcman.cghub.com/images**

@alsoknownasox That is awesome

@LUCIN0275 Very cool drone!

@pflame What would have to happen for me to be this good?

On the Wall

Facebook.com/3DArtistMagazine

Ray Salyer 3D Artist is a monthly tool that every artist of any kind should have in their toolbox. I look forward to my issues every month. Thanks to the team for making a mag that has taught me so much and rivals a community college graphics program. I was offered an assistant teaching job. Amazing!

Gurukesh Khopatkar This is my piece *Twisted Horror*. In my imagination the creature is a lifeguard rescuing people, but this time he has rescued someone perhaps heavier than he can lift...

If you want to have your work or thoughts displayed here, get in touch with us via email at **3dartist@imagine-publishing.co.uk**, via Facebook at **facebook.com/3DArtistMagazine** or on Twitter **@3DArtist**

Social media images of the month

Barbarian Minotaur **Facebook likes** 1,005
» **Brahim Azizi**
Brahim says: "Here is my new artwork, a barbarian creature sculpt. I have been working on this guy for more than a month in my free time. The sculpting, modelling, texturing, hair and lighting stages were all completed in ZBrush."

Connection III **Facebook likes** 581
» **Piotr Rusnarczyk**
Piotr says: "This is the latest work from my 'Connection' series, created with ZBrush, KeyShot and Photoshop. I used *Rose* for its creation, my favourite model as of late."

Free Earth model

Hi 3D Artist, There are plenty of tutorials and textures around the net to create a render of planet Earth but not many actual downloads. So, I've made my model as detailed as possible (although you might want to play with the textures a little to get it how you want it). Oh, I should mention it's also FREE www.pixeljockey.co.uk/portfolio/planet-earth

Tim Hoggarth

*Thanks Tim! For even more free models as well as some cool artwork, be sure to check out Tim's impressive online portfolio at **http://www.pixeljockey.co.uk**.*

YOUR TOP WALL POSTS

Movember Squid
» **Andy Jones**
Andy says: "I created this image for the November-based charity event Movember. I can't grow a moustache, so I made this guy for the effort. 'Good show', he says!"

Assassin Character
» **Adrian Dudak**
Adrian says: "This is the first character I've managed to finish. I've simply called it *Assassin*. It's inspired mainly by *Assassin's Creed*, but I tried to add my own elements to the character."

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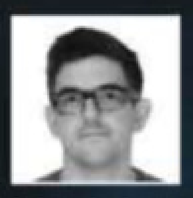
"THE FACT IS THAT WE WERE A GOOD COTTAGE CRAFT INDUSTRY AND WE'VE TURNED INTO A GREAT INDUSTRY" PAT JOSEPH



Michael Elson
Michael started his film career in 1990 at the Computer Film Company. He joined the Mill, then MPC as COO, growing the studio to a team of over 500. He is a consultant at Prime Focus
Studio The Mill, MPC and Prime Focus

Pat Joseph
Co-founder and Chief Creative Officer of The Mill, Pat has driven the studio's creative output since 1990. Pat is considered one of the most influential VFX professionals of the last two decades
Studio The Mill

Sir William Sargent
Founder and CEO of Framestore, one of the largest postproduction houses in the UK. The company won an Oscar for *The Golden Compass*, and recently completed years of astounding work on *Gravity*
Studio Framestore

Courtney Vanderslice-Law
One of the founders of the UK section of the Visual Effects Society and production director at Cinesite, one of the largest visual effects production companies in Europe
Studio Cinesite

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THE FUTURE OF VFX

The VFX Festival Panel Debate experts – from Framestore, The Mill, Prime Focus and Cinesite – reveal their views on what we can expect from the future of the UK's CG entertainment industry

Though the discussion of key issues within the VFX industry is something to expect from most computer graphics festivals these days, it's rather rare for that discussion to occur between competing individuals from London's most successful post-production houses. However, this was exactly what occurred at the VFX Festival's Panel Debate, late in 2013.

Attendees at the VUE Cinema in London's Leicester Square sat among the likes of Framestore founder Sir William Sargent, co-founder of The Mill Pat Joseph, former COO at MPC Michael Elson, and production director at Cinesite Courtney Vanderslice-Law. They listened as this top industry panel discussed everything from the ideal education for a professional career in VFX to the potential problems they believe the industry will face in the coming years.

However, much of the discussion centred around the recent rise of the UK as a focal hub for VFX, with films such as this year's visually groundbreaking *Gravity*, *World War Z*, and even *Captain America* all filmed and produced in the UK by a UK-based VFX crew. "We are a very film-friendly government, which sounds extremely dull, but it's hugely important because we have some very effective tax reliefs for the creative industries," explained the British Film Commission's senior production executive Samantha Perahia. "We have one for feature films, both low budget and big budget, as well as for high-end television and for animation, and we are currently working on tax incentives for video games as well."

"The fact is that there wasn't the capacity in the UK to do these tent-pole things. Now there is," began Courtney Vanderslice-Law, drawing on her years of experience working in LA to offer a different perspective on the UK's sudden popularity. "And when I say capacity I'm not talking about computers or render farms. I'm talking about the talent. At the end of the day, it's all about the talent, and on top of the talent is the attitude and the enthusiasm. I would get into this argument about using local talent when we were doing *Space Jam*, which was one of the first films that we were making in the UK. People would dismiss the idea, saying 'yeah, but everyone leaves for the pub at six o'clock there!' However, when we went for it we were all so incredibly impressed by the way the UK teams handled that creatively."

Although films such as *Space Jam* and *Gladiator* provided these early success stories for the UK VFX industry, when we sat with the panel post-debate, most of the experts agree that it was actually *Harry Potter* that started it all...

– What is it that makes London such a central hub for VFX? Why does so much film and advertising business come to Britain?

Pat Joseph (COO, The Mill) I think that the digital film work did come out of the UK's pre-existing international reputation with its advertising business. We are and have been the world leaders in TV visual effects for advertising because we used to write the best scripts. We built this industry in the UK on that reputation – and here I'm talking about three companies: Framestore, MPC and The Mill.

When it comes to films, *Harry Potter* gave us this fantastic franchise with a roster of highly experienced freelance in-house talent. A great problem I remember was we had something like 120 people on staff to deliver about 110 shots – that breaks down as a small VFX film, but a complex one and with things that hadn't really been done before. We really evolved as a business and that was the franchise that enabled that to happen.

The fact is that we were a good cottage craft industry and we've turned into a great industry. The important aspect to tax incentives is that we have to be aware of the threats, which are enormous. At the moment we are busy training other parts of the world to work for us. Think about the British motorcycle industry of the Sixties and how it got consumed by the Japanese.

The future of VFX

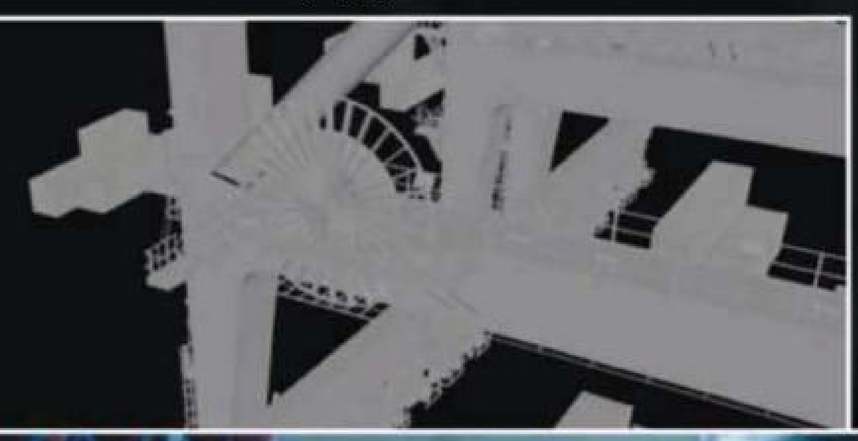
THE GOLD RUSH IS OVER

Experts described how the VFX business is maturing compared to its "gold rush laboratory business" days of the past, warning future VFX students not to assume that working within the industry would allow them to earn a huge wage in a few years' time. Despite the cautionary advice, they explained that VFX is still one of the few meritocratic industries where you can succeed through your best work alone, without the need for an exam or a degree to get in as a runner. "A lot of commitment and hard work is a must," says Pat Joseph, co-founder of The Mill. "You can't become a VFX supervisor in a year. You have to learn a lot, work hard and develop a real understanding of the processes involved. We want people who are hungry to learn and willing to work hard."

The Mill+ impressed the industry earlier this year with the incredibly photorealistic ape it created for PETA's '98% Human' spot. The studio developed technologies to simulate everything from the character's individual pores at the base of each hair to the actual bloodstreams running under the skin

TOP The VFX industry is a highly skilled and technical business. One misconception discussed during the debate was how working in it tends to be glamourised

BOTTOM Impressively, many of last year's biggest films were worked on by highly skilled teams based in the UK



Courtney Vanderslice-Law (production director, Cinesite) I came to the UK from a Los Angeles facility to work for a London facility in 1993. It was very small at the time – you didn't have your Framestores or MPCs – and one of the challenges faced was that the talent was so small, and there wasn't a lot of freelance staff. All the freelance staff were going to America, and it was called the brain drain of the UK. The *Harry Potter*s have made a huge difference. Our first big *Harry Potter* job was probably on the first film, and suddenly all that talent that had gone to the US to work on the big productions had come back to the UK!

Hollywood continues to embrace the UK as a premier filmmaking destination. This is due to the incredible infrastructure that we have in terms of studios, technicians and creative artistry. Specifically with VFX, clients really enjoy the community feel we have in Soho; you cannot underestimate the attraction there is for the fact that they can walk from one facility to the next, especially if they share work between facilities.

The UK has always been seen as a hot bed of creative talent, and will continue to be seen as such. The danger at the moment, specifically with VFX, is the global economic pressure placed on the cost of us producing work because of tax incentives in other countries. London Soho, where most of the VFX houses are based, is not a cheap location.

– In the panel debate you mentioned the need to educate not just at university level, but also for younger students to learn about the fact that VFX is a career choice. Can you tell us more about the methods in which you feel this can best be achieved?

Courtney Vanderslice-Law Something that many of us already do, because we are parents who already have children in secondary schools, is give talks at the schools that our children attend. Cinesite's animation director, Eamonn Butler, frequently gives talks to schools. He did one in December, in fact, for the charity Film Nation UK, which provides educational talks and activities in order to encourage children's interest in film.

These lectures and talks are always well attended and enjoyed by students. They find it visually interesting and enjoy the glamour of seeing behind the scenes of the film industry.

From a more formal perspective, UK Skillset needs to investigate how to roll out a program, with the help of our industry leaders, that targets secondary schools, setting up a series of lectures and visits to introduce VFX as a career option. Many schools have film clubs and programs that invite filmmakers from different industry sectors to talk to their students. We need to use this platform more.

There is a particularly poor awareness for students interested in maths and sciences of the potential application of their skills to VFX; yet these are the students who hold the most potential for us in the sought-after technical positions, which are most difficult to recruit. We need to raise awareness at a younger age, among both girls and boys.

Many think that it is an elite industry, but it really isn't. Some of our runners five years ago have turned out to be our best modellers and our best TDs. It's about that enthusiasm and putting yourself forward.

Michael Elson (consultant, Prime Focus) We want the superstar maths students, not just the kids who have studied media or drama.

I'm not sure if you want to teach secondary school kids that VFX specifically is a career choice, but more that the film industry is a potential career choice. Create a focus away from the obvious – acting and directing – and open up the myriad of trades that make up the construction of a film. VFX is just one of those. I love Film Club and how it encourages young kids to really engage with and think about the films they are watching; the association with BAFTA and industry professionals visiting schools is great.

"WE WANT THE SUPERSTAR MATHS STUDENTS, NOT JUST THE KIDS WHO HAVE STUDIED MEDIA OR DRAMA"
MICHAEL ELSON

Pat Joseph At The Mill we work hard on improving pathways into our industry at all levels. We have our long-standing running programme which has a huge success rate in converting runners into artists and producers, as well as our internal mentoring programme to continue training and support.

I think that businesses like ours absolutely need to interact with schools to make sure that we provide real-world experience, and let students comprehend that there really is a role in this kind of business in the UK. I still know that most kids do not appreciate that there is a fantastic business out there. Not that they're all going to be Ridley Scott, but that there is a way to progress through a stable business route. I will caution one thing though: we are in danger of creating a bunch of people with great skills but training for more positions than we actually have.

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Prime Focus's work on *White House Down*. Michael Elson currently works at Prime Focus as a consultant, following a career that saw him grow MPC from a team of six to over 500 as COO
© Columbia Pictures 2013

– So, you feel there is a real danger of there being too many skilled people in an industry that lacks the jobs to support them?

Michael Elson If there is a contraction of the VFX business here, then yes, quite possibly. If we, as an industry, are able to transition into a more sustainable business model through which we are better able to balance our overheads with the expectations of productions and the continuing downward pressure of revenue per show, then I would hope we can continue to attract high-class productions and continue to deliver world-class FX and job opportunities.

Due to the severe skills shortage in the UK, we have had to rely on securing overseas talent. If we saw more homegrown, appropriately educated graduates or entry-level kids with core skills in math and coding, I believe the UK VFX industry has ample opportunities for all.

Courtney Vanderslice-Law There is always a demand for talented people, both creatively and technically, and the 'good ones' will always be able to get a job. You could say the same about any job sector with the current economic situation globally.

There is an additional challenge at the moment because the entry-level positions traditionally used to train students, such as rotoscoping and matchmoving, are more often being outsourced to other regions, due to economic pressures. This means that there are fewer opportunities to progress from entry level, and there is a high demand for talented artists at a more senior level.

– What are the realistic expectations that you think someone should have for their first five years of work in the industry?

Courtney Vanderslice-Law When Cinesite first opened in 1993, the industry was at an embryonic stage, and the opportunities for people to progress quickly were far greater. Most of the people who started out then are now the respected 'elders' of the industry.

Someone starting out today would be up against many other candidates for the same position, and it will take longer to achieve a level of seniority than it did even 10 years ago. Having said that, very talented people do always tend to get identified and fast tracked.

Michael Elson If they work hard, they will learn a trade that will set them up for the rest of their working lives. Oh, and they should expect to put a lot of hours in!

Sir William Sargent (CEO, Framestore) In terms of how they could expect to be treated, in the UK people contracted as freelancers as well as contracted workers do have the same rights, holiday, sick pay and everything else, so my observation is that the UK is unusual in the countries that we compete with, such as New Zealand, Canada or America. Because we are also competitive among ourselves, if we did not provide those things, our studios would very quickly be places people would not want to work in.

That doesn't mean things can't go wrong, but as a rule we try to create an environment in which you would want to work, so I feel pretty good about the state of the UK.

– What are the main skills that you look for in new recruits? What kind of key skills do hopeful employees require?

Courtney Vanderslice-Law The main skills we look for are initiative, common sense, pro-activeness and enthusiasm. We have had people who are technically very talented start out as runners, so we need good team players who are passionate about what they do.

I think that one of the areas that we're weakest in is in our technical TDs and pipeline people. It's a skillset that we need, which is why we also target schools for people specifically with a science background – this is really important in visual effects, because of all the simulations involved and their increased use in films today.

Michael Elson A great work ethic and a modicum of self-awareness! We are still a sector of the business that could be called a meritocracy. If you are good at what you do, you will get on and go far. When you are starting out, chase the experience, rather than the money. With experience, hopefully the money will follow!

WINNING AN OSCAR

"For most of our companies you are doing a service, so when you win awards, sadly it doesn't give you a premium on the next job; all it does is make you a member of a club," explains Framestore's Sir William Sargent. "Leveraging is something that I still haven't really figured out how to do after 20-something years, but I do think we've reinforced London as a destination for the film community. London is a very international part of the world, and there's a reinforcement process that is going on so that generally two out of three of the nominees for the visual effects Oscar each year are somewhere in our ranks. What an Oscar does is reaffirm your credentials – it doesn't guarantee you business and it certainly doesn't get you a better price."

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William co-founded Framestore in 1986. The company has since won three Oscars and has been nominated for another three

The future of VFX

– What new successes and challenges do you foresee for the VFX industry in the future?

Sir William Sargent If you look at the last five years, the main box-office films have had heavy digital content. Storytelling is now fundamentally using digital as one of the many tools. Along with cameras, lights and actors, it has become a standard as apposed to unusual, unique or different. The budgets are also getting more challenging; more ambitious films need to be made for the same or less money, but then that's not unique to this industry. We're just in a world where you always have to be bigger, better and quicker, with less resources, so the challenges are the same as they are anywhere else, frankly.

Interest is also going from being the go-to guys to being the people who initiate the creative work themselves. The thing that we haven't been hugely great at is mining directors or artists from within the company who have then gone on to direct. We have succeeded about a dozen times in eight or nine years, which is a disappointment to me because I know the nature of the talent that is within the company. You forget what was said on people's CVs when they applied for a job five years earlier, what their dreams were at the time. I think in 800 people, at least 50 per cent wanted to be filmmakers.

I feel very optimistic about the future. I strongly believe the stories of the future will be told on many platforms. George Lucas is effectively pioneering and building this business model, and a director we've managed to connect with is going to tell his story with a single storyline and bunch of characters across a bunch of different media in a totally nonlinear fashion. This, in particular, excites me, and I hope I get there before any of the other guys!

Courtney Vanderslice-Law The UK has succeeded in establishing itself as a premier destination for both Hollywood blockbusters, and the incredible talents of independent filmmakers. You cannot overlook the fact that a lot of the lower-budget, successful British films are also being done by the same British facilities working on the Hollywood blockbusters.

The challenge for all of the VFX industry is to be able to adapt a business model that enables us to contribute significantly to the creative content of a film, while operating a profitable business. Animated content is an area Cinesite has been interested in for some time, and a few months ago, we began work on our first in-house animated short, *Beans*.

Tax subsidies are a very contentious topic at the moment. However, this is no different from other businesses, and we need to learn to adapt and compete in the current climate.

Pat Joseph It's been an incredible year at The Mill, with some of the best work from all our studios; London's award winning Guinness *Cloud*, LA and London's joint Mill+ collaboration on the cinematics for Activision's *Call of Duty: Ghosts* and New York's Cannes Gold Lion winning PETA *98% Human* to name a few. We've collaborated with some of the best directors and agencies in the world.

We continue to evolve as a business. We launched our third US office in Chicago, which has been a huge success and is continuing to expand, and The Mill in London will move in to our bespoke-deigned new home in Windmill Street, resetting the standard of VFX studios worldwide.

TOP NOTCH EDUCATION

Escape Studios, Bournemouth University and newcomer Swansea, where 10 out of 25 graduates went into VFX roles last year, were singled out by the panellists as some of the chief universities for industry-standard education.

"Up until a few years ago, the schools were not in line with the software and hardware packages the industry used. This has changed, but the students need to learn much more than just specific software and technology. They need to understand the pipeline, teamwork and deadlines behind executing visual effects," explains Courtney Vanderslice-Law. "What Escape Studios does well is reach out to VFX industry partners to ensure that the shots their students work on and produce for their showreels are grounded in the reality of the kind of work we do, and the type of shots we usually work on."

Courtney Vanderslice-Law emphasised the need for not only creative artists, but also project managers and those who have the business sense to manage jobs well

"MANY THINK IT IS AN ELITE INDUSTRY, BUT IT REALLY ISN'T. SOME OF OUR RUNNERS FIVE YEARS AGO HAVE TURNED OUT TO BE OUR BEST MODELLERS AND OUR BEST TDS. IT'S JUST ABOUT THAT ENTHUSIASM AND PUTTING YOURSELF FORWARD" COURTNEY VANDERSLICE-LAW

Framestore received an Oscar for its work on *The Golden Compass*, and has since worked on blockbusters such as *Avatar*, *The Dark Knight* and *Harry Potter*. Sir William Sargent has been involved with Framestore since 1986
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RIGGING EXPLORED

Rigging is considered something of a dark art – integral to the animation process, but avoided by many as the dauntingly technical side of the business. We got in touch with some top riggers in the business to see if they could break the processes down and shed some light on one of the more unsung processes in the animation industry

THE BONES BEHIND THE BEAUTY

Modern animation is an intricate and complex process, requiring the work of many skilled artists to complete even the simplest of gestures. However, for regular viewers unaware of the work that goes on behind the scenes, the actual process of creation remains a mystery. They have little to no knowledge of the painstaking, precise and meticulous work that powers each and every movement we are dazzled by on screen. The final action may be completed in less than a minute, but the planning that goes into it stretches back many months.

In the days when hand-drawn 2D animation was king, artists simply needed to draw the various frames of a sweeping hand or smiling mouth. Now, in the world of 3D, a team of artists must collaborate, with animators only able to complete their task once a rigger has completed theirs. It's rigging that enables animators to create a moveable, functioning skeleton, with animators taking control of these rigs to simulate movement through physics and structure. "Essentially, the rigger is placing the CG strings on the digital puppet" says Jahirul Amin, Maya lecturer at Bournemouth University.

For Harry Gladwin Geoghehan, senior technical animator at stalwart UK videogame developer Rebellion, the key purpose of rigging should be to give animators the freedom to create awesome animation with the fewest amount of barriers. "Riggers bridge the gap that exists between artists and animators, with the rigging team taking beautiful 3D meshes and preparing them for everything an animator will throw at them," he explains. "Quite simply, without rigging there can be no animation."

In Geoghehan's experience, the role of a rigger is far more complex than it once was. "We now are responsible for a range of duties alongside rigging," he explains. "These cover areas like topology guidance, deformation, animation tools, pipeline and, in the case of videogames, interfacing with game engines when importing or exporting."

3D meshes are complicated things, and without the strings to hold them up, they're likely to collapse on themselves. While you could theoretically animate certain movements in a scene procedurally or through simulation where no rig is needed, it would be an impossible task to complete for elements such as characters, which absolutely require a rig for convincing weight deformations and a realistic skeletal form.

"Any professional rig needs to be very flexible" explains Joseph DiLallo, character set-up supervisor on *Cloudy With A Chance Of Meatballs 2*. "The animators need to hit any combination of poses, which are dictated by the style of the character and the needs of the directors and animation supervisor. In the case of *Cloudy 2*, the facial and body poses that the characters needed to achieve were very extreme, with mouth corners moving all the way up to the level of their eyeballs. They were extremely graphical too; contorted shapes made with their bodies were commonplace in this movie."

To achieve such extreme and dynamic animation, the rigger and the animator must work as one, each understanding the other's work. "It's crucial when rigging for animation that we provide the animator with enough control for him or her to achieve the intended performance," explains Amin. "If the animator is constantly fighting the rig, then the rigger has not done the job properly."

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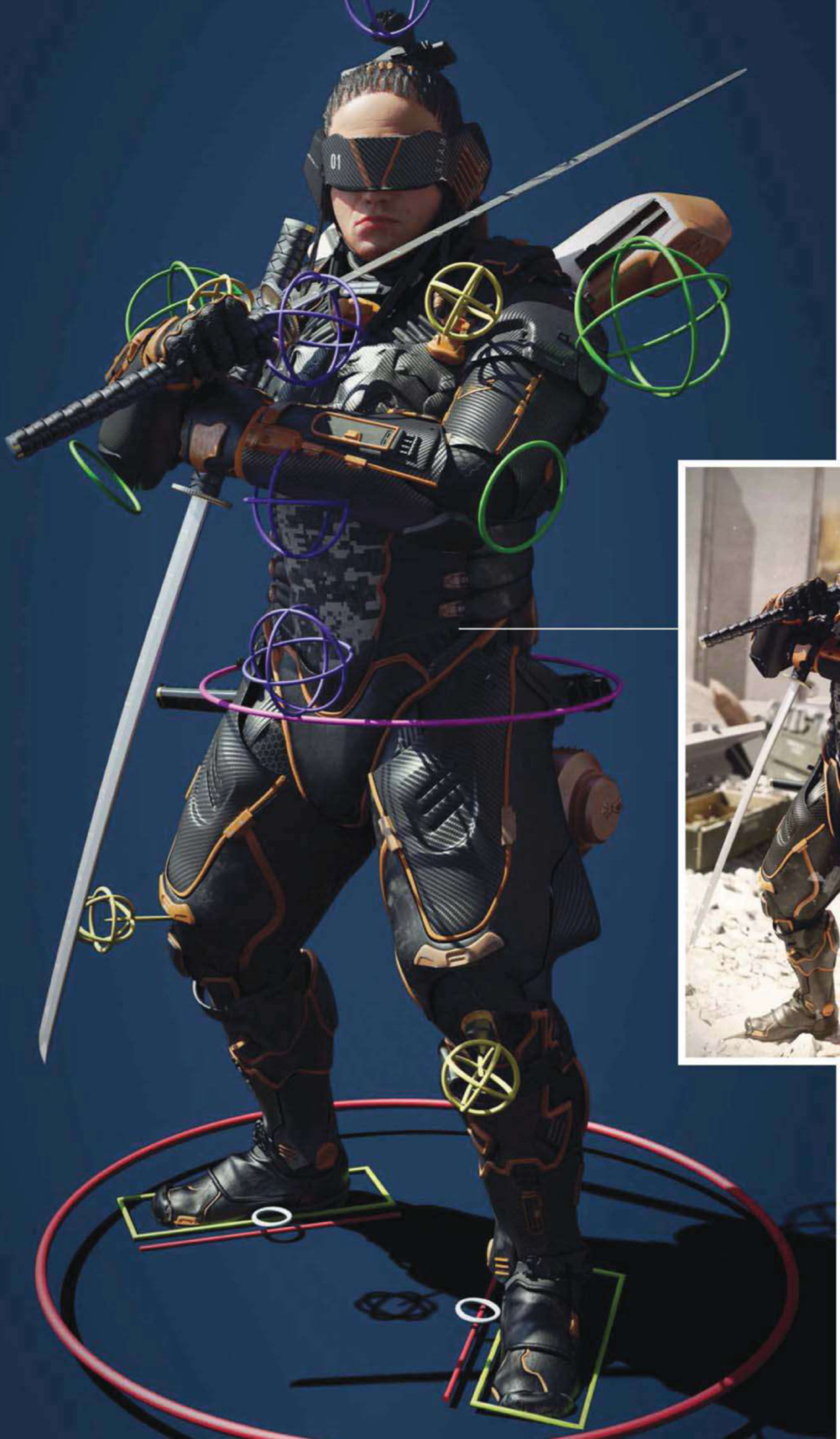

HASAN BAJRAMOVIC
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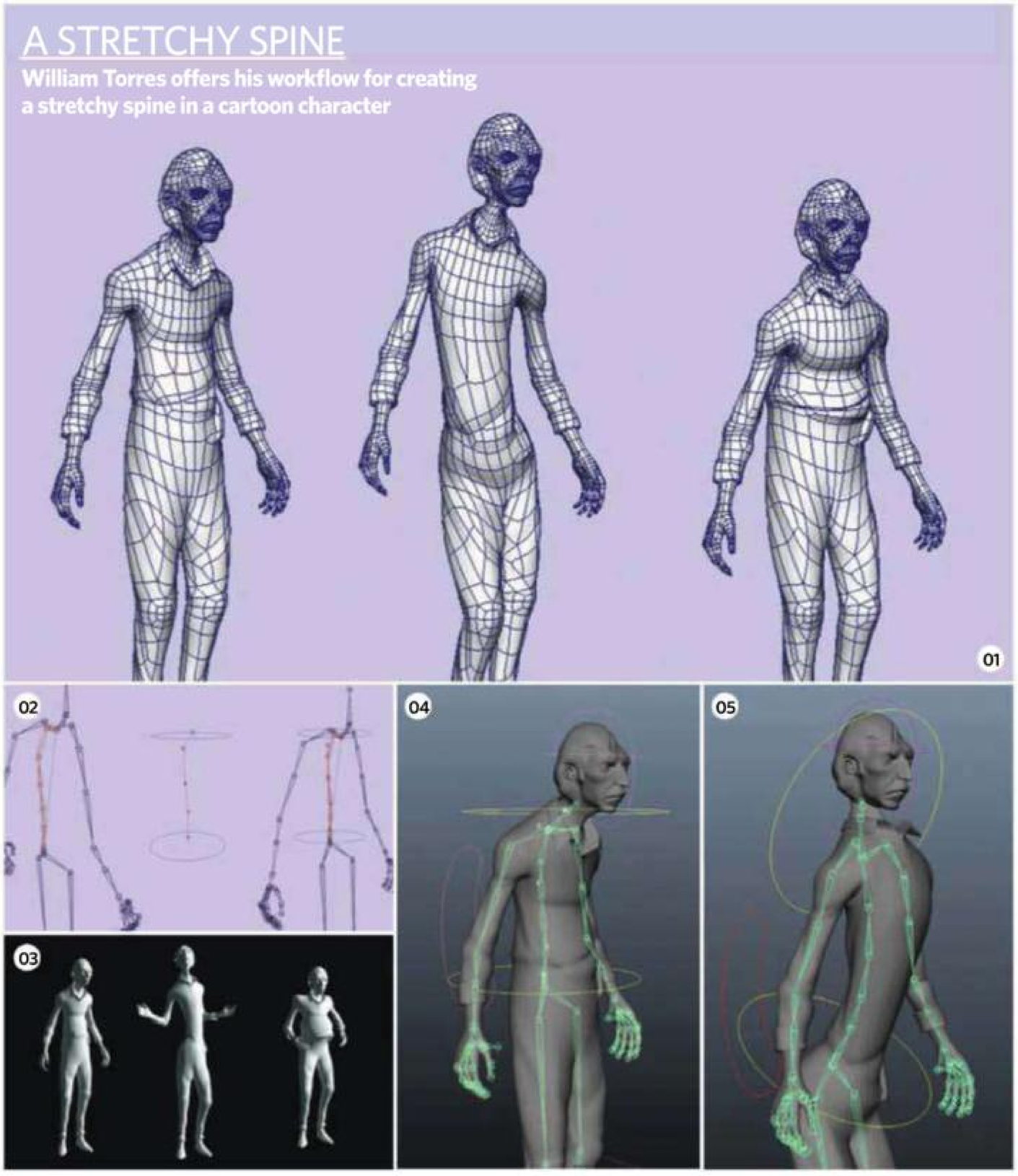
Daiichi
"Once I was done with the shading of this character I created a simple rig in order to try out various poses. Rigging was completed with 3ds Max and I used BonesPro for skinning. I fixed any problematic areas I encountered by adding an edit poly modifier on top."

Rigging explored

A STRETCHY SPINE

William Torres offers his workflow for creating a stretchy spine in a cartoon character



01 I begin with a skeleton where all the joints are cleanly oriented. I then start the rig by using an IK Spline with four spans from the lower stomach to the neck. Make sure the lower stomach joint is just above the main hip joint, and the neck joint is above the shoulders.

02 Next I create five clusters from the spline curve's control vertex. A curve with four spans will have seven control vertex, therefore the clusters at each end of the curve contain two control vertex, and the three middle clusters contain just one control vertex each.

03 A hip and shoulder control are positioned and, as always, the transforms of the controls are frozen so the rotation and translation are zero at default position. The top two clusters are parented to the shoulder control, and the bottom two to the hip control. I parent-constraint the middle cluster to both the hip and shoulder control so it moves with an average influence.

04 The key to the stretch is using a curveInfo node. I create a curveInfo node and connect it to the spline curve (curveShape1.worldSpace[0]->curveInfo1.inputCurve). The curveInfo node will now output the arcLength of the curve as we move the controllers. I use this arcLength output in an expression to give me the scale as it changes (float $jScale = curveInfo1.arcLength / default arcLength;). Some people prefer to use multiply and divide utility nodes instead of expressions. In this case, either will work. Use what is easier for you.

05 Now I have isolated the scale of the spline curve in the variable $jScale, I use an expression to stretch each bone in the spine so it matches the changing length of the spline curve. For each bone in the spine I use the following expression: joint1.translateY = $jScale * default joint1.translateY. Now, when I move a controller, the scale is transferred to the joints giving it a suitably stretchy and bendy look.

Additional features to consider adding to your rig:

-Explore solutions to drive the twist of the spline IK
-Give the mass of the mesh squash and stretch by using a set driven key to drive some blend shapes.
-Free orient arms and neck. This will help to balance a human character out, and also aids in a natural type of pose and movement.

PROCESS AND DELIVERY

With such a complex and technical challenge forming the basis of a rigger's everyday work, the tools need to be up to scratch. Today, the industry standard remains Maya. "Our hardware is Linux workstations running Fedora," DiLallo tells us. "Our software is Maya with custom deformers such as WireSkin, and a whole slew of MEL and Python-based tools to aid in the character setup process."

Amin concurs. "Primarily I tend to use Maya, but I have also dabbled in Softimage and 3ds Max. I try to develop skills that are transferable as I don't like to allow software to dictate how I create my rigs."

Geoghehan similarly believes that a wide range of tools and customisable software is the best approach to a workable rig. "My main package for rigging is Maya, which I've been using professionally for four years, but I am also experienced in 3ds Max and MotionBuilder," he tells us. "I write a lot of custom tools/plug-ins/GUIs using either Python or Maya's API and have experience with Mel/Maxscript too. Hardware wise I generally stick to PC, as that has been the main hardware platform for the studios I've worked at. I do tend to prototype ideas first on my MacBook though. PC specs aren't too big a requirement for rigging unless you are struggling with framerates, however a decent quad core and a solid gaming card with plenty of RAM are enough to get stuck into rigging. As I generally produce content for videogame consoles, we have to work smartly and efficiently as we are rendering in milliseconds rather than hours."

So how do these artists actually go about building a rig? The right hardware and software is all well and good, but where to start when getting down to business? "Start with a plan!" says Geoghehan. "Over time, riggers build up a toolbox of methods, code snippets and tools that allow them to take on most rigging tasks. However, even with quite a big toolbox, I always start by planning. Break the task down into its various smaller components. This means highlighting what your knowns and unknowns are, and then prioritising tasks against your timescale for delivery."

This is solid advice for any part of the creative process, but in a subject as daunting as rigging a large character or set of characters in a videogame, it's absolutely vital.

"Generally, for a character, I'll think about the anatomy of what I'm going to rig, which will inform an initial joint placement," continues Geoghehan. "I will then iterate over mesh topology and skinning, as, even with the most complex of rigs, bad deformation will still look bad. Once happy with deformation I tend to set up a range of motion that covers several of the key poses a character needs to hit in the project we're working on. If it passes this stage, then it's on to rigging."

Top Tips

✓ TOPOLOGY
All good character deformation starts with good edge loop flow. Understand how your character will move, and plan accordingly.

✓ SQUASH AND STRETCH
Like a water balloon, look at how volume is distributed as a character's parts squash and stretch.

✓ STAY ORGANISED
A character's rig can quickly fill up with nodes, shapes and expressions. It's always a good habit to get into naming things appropriately and keeping everything in order.

✓ RECOMMENDED READING
- *The Artists' Complete Guide to Facial Expression* by Gary Faigin
- *Dynamic Anatomy* by Burne Hogarth
- *Stop Staring* by Jason Osipa
- *Facial Expressions* by Mark Simon

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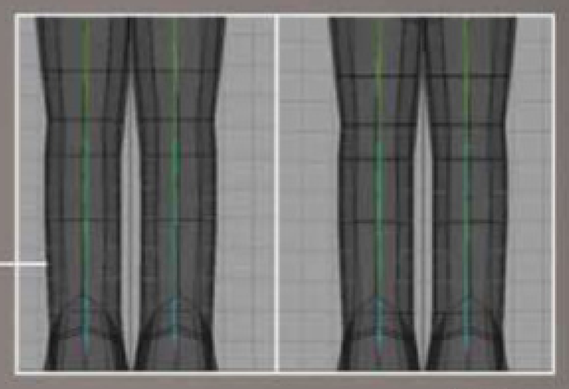
RIGGING FOR CARTOON ANIMATION

Elliot Stammers discusses his approaches to rigging, using the character Kyle Hunt from his graduate project 'Customs' (tinyurl.com/3DARiggingCustoms)

The face

When it comes to cartoonish facial animation, remember deformers such as clusters and lattices give an animator a big range of motion for a fraction of the effort of those using blend shapes. With the exception of a few corrective and sculptural shapes to wrinkle the nose and brow, Kyle's facial deformations are entirely joint-based



Curves

Animators love curves; it's a fact! To ensure a smooth, curvy result during animation it's important that you start with clean, smooth topology. Try to remove any roughness or uneven flow in your edge loops before you start rigging

Simplicity

The simple solutions are usually the best. Sometimes a driven key is all you need to solve a problem. Kyle's shirt collar is keyed to avoid intersections with the shoulders by opening out as the shoulders shrug; nothing fancy!

Extra rigging

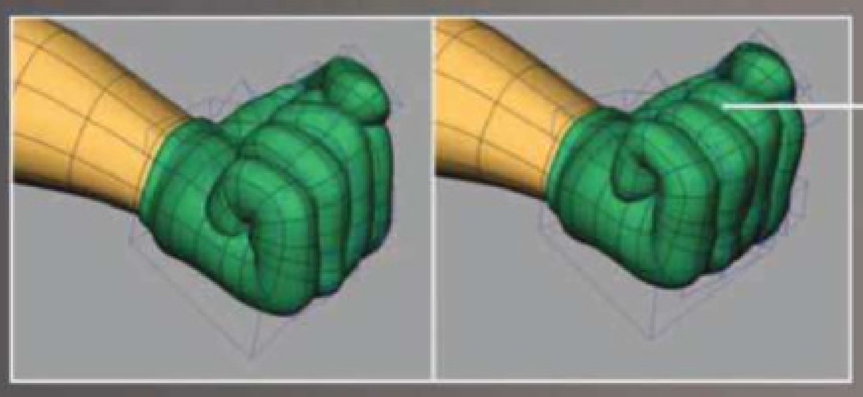
Smooth skins are fantastic, offering a fast approximation of shape that the animator can work with. However, know when to quit – no amount of weight painting will give you that perfect shape in every pose. If you're still unhappy with the results, chances are you need to put down the paintbrush and do some more rigging. Add twist joints, influence objects and consider looking at muscles for a second pass

Functionality

It's easy to get carried away creating beautiful control shapes but don't forget they serve a functional purpose. Ensure your shapes are visible and easy to select, and align with the actual control pivot. A foot control that doesn't align with the ground when the foot is planted can be visually frustrating for an animator

Stretch shaders

Stretchy limbs and spine free the animator to really push for the shapes they want, but it can make it easy for them to lose sense of the character's original proportions. So, try applying stretch shaders to the model that glow when stretching occurs. It's a very helpful indicator



Finger joints

Any animator will tell you the importance of being able to pose a strong fist with the hands, and a fist with empty spaces between segments of the fingers will never look right. So, thicken the finger joints by scaling them as they curl. It's a simple and effective technique

Rigging explored

CREATURE RIGGING

Georg Schneider of discusses some of his top tips and techniques for creature rigging

Creature rigging can often be even more challenging than building a bidped rig. For one, there are a lot more free biped rigs available to study and analyse. Most software packages also come with rigging solutions that deal with a large part of rig creation automatically, but creatures have unique body parts, meaning you need to come up with your own solutions. As challenging as this is, it can be just as interesting to analyse the underlying anatomy, and experiment to develop a rig that works. The squid in this example was crated for the short film 'Deep Dance' **(tinyurl.com/3DARiggingDeepDance)**

Fins

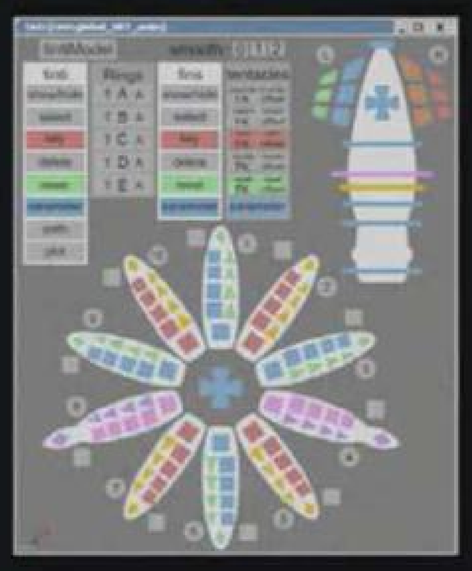
The fins of a squid move in a wavelike motion. This rig provides a simplified method of creating this motion using parameters to control the amplitude, the wavelength and the frequency of the wave. The resulting motion can be copied to the control objects of the fins

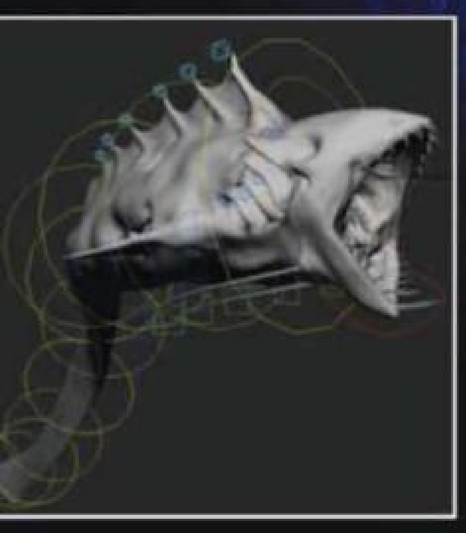
Internal organs

Of course, internal organs are usually not visible, but this squid is transparent. The basic motion was created using a procedural animation that worked for most shots, but could be refined if required

Tentacles

All 10 tentacles on this model can be bent and twisted together. This helped to created a dragging motion when the squid rolls. A basic swimming movement, meanwhile, can be created procedurally. The tentacles bend automatically, matching the path that the squid swims and reacting dynamically to the body movement





Top Tips

✓ R&D

As creature TD you are responsible for delivering a rig that gives the animator the control he needs. The rig has to be fast, easy to use and stable. First you must analyse the animation requirements and check what the creature needs to be able to do. When it comes to building the rig, the process involves a lot of experimentation and searching for solutions. You have to try new things until you find a result that works. Try showing your rig to an animator to identify what needs to be improved.

✓ STUDY BIOLOGY

Creating believable creature rigs requires a basic understanding of general anatomy. Even on fantasy creatures you should imagine how the underlying anatomy would work, so analyse where muscles should be to position the joints and create the desired motion.

✓ USE A SKELETON MESH

Using a skeleton mesh for you creature can help you to find the right location for your creature's joints. The skeleton will also come in helpful as a reference to check and preserve the volume during skinning. For example, the rib cage might not deform as much as you expected, but if you check the skeleton you can see how things are supposed to work.

✓ UNDERSTAND ANIMATION

It's your job to create a rig that gives the animator the control he or she requires, without compromising their ideas. The rig must be simple, robust and give the animator fast feedback. To come up with an animator-friendly solution it is important to know at least the basics of how an animator works.

✓ SCRIPTING

Even basic programming skills can help to speed up the creation of a rig, which often involves repetitive tasks. It's a helpful asset to be able to develop tools to support your work and add efficiency to workflows. Learning scripting is recommended and will pay off quickly. It's also a huge plus to be able to mention scripting skills on you resume!

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MOVIE MAGIC

"The main aim for the rig is to enable an animator to create good animation. This means keeping it intuitive and removing as many blockers from the animation process as you can," Amin tells us. "I think at the rigging stage it is important to work with your animators to agree on a rig specification and then deliver to it.

"I tend to start by creating all the joints for the rig." Amin continues. "It's important to place them as correctly as you can so when the character articulates, it deforms well. Looking at skeletal references can be helpful during this process, although you may have to simplify the digital skeleton to avoid over-complicating the rig. For example, the human vertebrae has 24 bones, but this may be simplified down to three to six bones on the computer. The overall plan is to create believable movement.

"Once the bones are in place, it's usually a matter of creating the controls that the animator will use to manipulate the model. Usually, NURBS curves are used, as they can be easily modified to create custom control shapes.

"After this comes the laborious process of skinning, also known as binding, weighting or enveloping. This is where we define how much influence each joint has over the vertices of the model. This is a crucial part of the character setup process, as the quality of character deformation depends on it. Corrective shapes can always be applied on top to fix problem areas that cannot be rectified through weight painting. For example, when the arm is bent you may lose volume in the elbow; applying a corrective shape on top will allow you to bring the form back out.

"Muscle systems could also be used in conjunction with classic weight painting techniques such as Muscle in Maya, while the Creation toolkit from Fabric Engine is looking very promising too."

When dealing with high-budget animated features, rigging becomes an even more integral part of the process. Animated films are becoming ever more ambitious, and rigs are scaling with that new demand for complexity. As such, rigging is an early consideration in the production process. "In rigging we begin early on in pre-production after the character designs are fleshed out," says DiLallo. "We need to know what the director has in mind for the character's performance so we can customise the rigs to meet their needs.

"After we know what kind of poses the rigs need to hit, we then work together with the modellers, giving them feedback to insure the topology will work with our rigging systems. When the models are in good shape, we start building body and face rigs. Often Layout needs a very rough, fast, body rig that we call an 'ST', so we create that first. We usually release the rigs in passes, while seeking feedback from the animation supervisors along the way. We try to get them a first pass of the rigs very quickly so they can test them out, get approval from the directors, and find out if we are headed in the right direction."

RIGGING FOR REALISTIC HUMANS

Les Garner of Sixus1 Media, discusses his approaches to realistic rigging

When rigging, my focus is to strike a balance between joint mobility and efficiency of control, while remaining conscious of platform compatibility concerns.

The rigging begins with a model that has logical, clean edge flow. The next concern is skin weights. There are a lot of automated systems available now, but it's still useful to be able to finesse them by hand, down to the vertex level.

As far as the control rig itself goes, once you are past the point of the basic bones, I find that it is all really a matter of personal style. At Sixus1 Media, I am most often the animator as well as the rigger/TD, so I have my own approach that I am comfortable with. If I am working with another animator, though, I suggest spending as much time as possible getting to know their aims and intentions, in order to build rigs that will cater to their preferences rather than giving them a setup you may personally like.

Hair

To provide hair animation compatible with the project's engine, each of the girl's dreadlocks are rigged bone chains that are then driven by a combination of dynamics and a custom rotational control setup

Face

Bringing facial animation to a mobile device-compatible engine without the use of sculpted morphs meant creating a system of individual bones, whose weights control areas of the face relating to key muscle movements

Control

My overall approach to rigging is to provide the maximum amount of control in the fewest contact points for the animator as possible

Arms/hands

To expedite arm and hand animation, custom channels were created to drive specific bending ratios for joints of the fingers. IK/FK switching of the arms were also bound to the control objects for the hands. Similar controls were set up for the feet, legs and clothing

Head/face

Controls for the face and head were housed in custom control channels located on the hip controller object for fast, easy access, providing the ability to animate much of the expressiveness of the character without changing the selection

Top tips

✓ QUALITY TOPOLOGY IS KEY
The cleaner the topology and edge flow of the mesh, the easier rigging and smoother the animation will be. A good topology for animation has adequate edge flow around important joints for smooth deformation once it is rigged.

✓ UNDERSTAND ANATOMY
Anatomy is crucial, not just in modelling but rigging as well. Paying close attention to where the pivots of bones would actually occur may seem obvious, but it's something that cannot be understated. You need to be ready for joints that have a floating aspect to them, such as shoulder blades or, to a lesser degree, the hips.

✓ TEST!
Test your rig frequently and vigorously. Push it until it breaks then come up with ways to either fix issues you find or prevent the end user from running into them. Not all issues can ever be discovered before a character ends up in the hands of whoever will be ultimately working with it, but the more you can work out those bugs in advance, the better their experience with it will be, and the less revision and maintenance you'll be required to do later.

✓ BE FLEXIBLE
Listen to your animators and/or director when entering into the rigging process. Know what they want, need and expect, and be prepared to alter your own ideas about rigging to suit what will fit the project. More often than not, even if the requirements of a team seem strange, there's a good reason for it, so take it as an opportunity to expand your experience and learn from it.

✓ EXPERIMENT WITH STYLE
Never get in a rut with rigging. Always test yourself, and try out new ways to set up control schemes. In my experience, even among seemingly similar characters like humanoids, there are often nuances of character that will be best served by being able to adapt your own ideas about rigging on the fly.

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CHALLENGE AND SUCCESS

"The most challenging rig I've built was Earl's face on *Cloudy with a Chance of Meatballs*," remembers DiLallo. "The animators and directors needed him to have an incredible range to his mouth and brows that pushed the model to its limits, while creating a very specific stylised look. The shapes were so extreme that I sculpted a large array of corrective shapes on top of the results of our deformer-based facial rig. I also employed a complicated network of combinatorial shapes that worked together to make sure his face model kept its integrity in the various poses the animators threw at it."

However, although examples such as Gollum's face in The Hobbit are clearly rigging at its most extreme, it's not just facial rigs that can demand a great deal of attention from animators. Even basic biped rigs can pose a great challenge. "I like to dabble with testing out different methods for creating believable deformation," says Amin. "For example, the shoulder region, in particular, can be a troublesome area to get right as there is so much happening when the arm is raised. Paying respect to the scapulohumeral rhythm and having an understanding of the roles the scapula, humerus and clavicle play during this movement is crucial when replicating it in CG. Going back and analysing references thoroughly is crucial to overcoming the challenge of rigging."

Videogame rigging presents something of a different challenge. Not only do the rigs need to inform real-time animation, but they're also driven by the player, who can change a character's directional movement at any given time. Consider *Assassin's Creed*, where the protagonist's motion can change from a walk, to a run, to a 180-degree turn at a moment's notice. "A challenging rig I had to build was for a pitch we created for a game where a character could transform from biped to quadruped and back again, being animateable in each state," says Geoghehan. "It wasn't allowed to have any rig, mesh or skinning swaps and had to work in game real-time on Xbox 360. We really had to break down each part of the character into components and figure out a way to make them transform. We then had to find a way to put it all together into a single rig and come up with a method for countering the huge changes in volume while keeping a single skin cluster! It was a huge but rewarding challenge, and a true shame it never made it into a game."

GETTING IN

Harry Gladwin Geoghehan explains how best to embark on a career in rigging

"The main thing, as with any job, would be to know it's what you want. Rigging requires a very specific kind of person – someone who doesn't see a problem as a block but as a challenge to overcome; someone who can pre-empt problems and innovate solutions. As well as these characteristics, a good grounding in maths and art counts for a lot. Developing a good artistic eye is key to solving issues like deformation, and maths – although many hate it in school – has become something I do almost daily. Anybody can get hold of tutorials and re-create what is in them but that doesn't make you a good rigger. There is no right way of doing things. Although there are standard approaches to some aspects of rigging, you should never worry that something is wrong if you're getting good results."

VEHICLE RIGGING

Maya expert Jahirul Amin takes a look at the intricacies involved in rigging vehicles

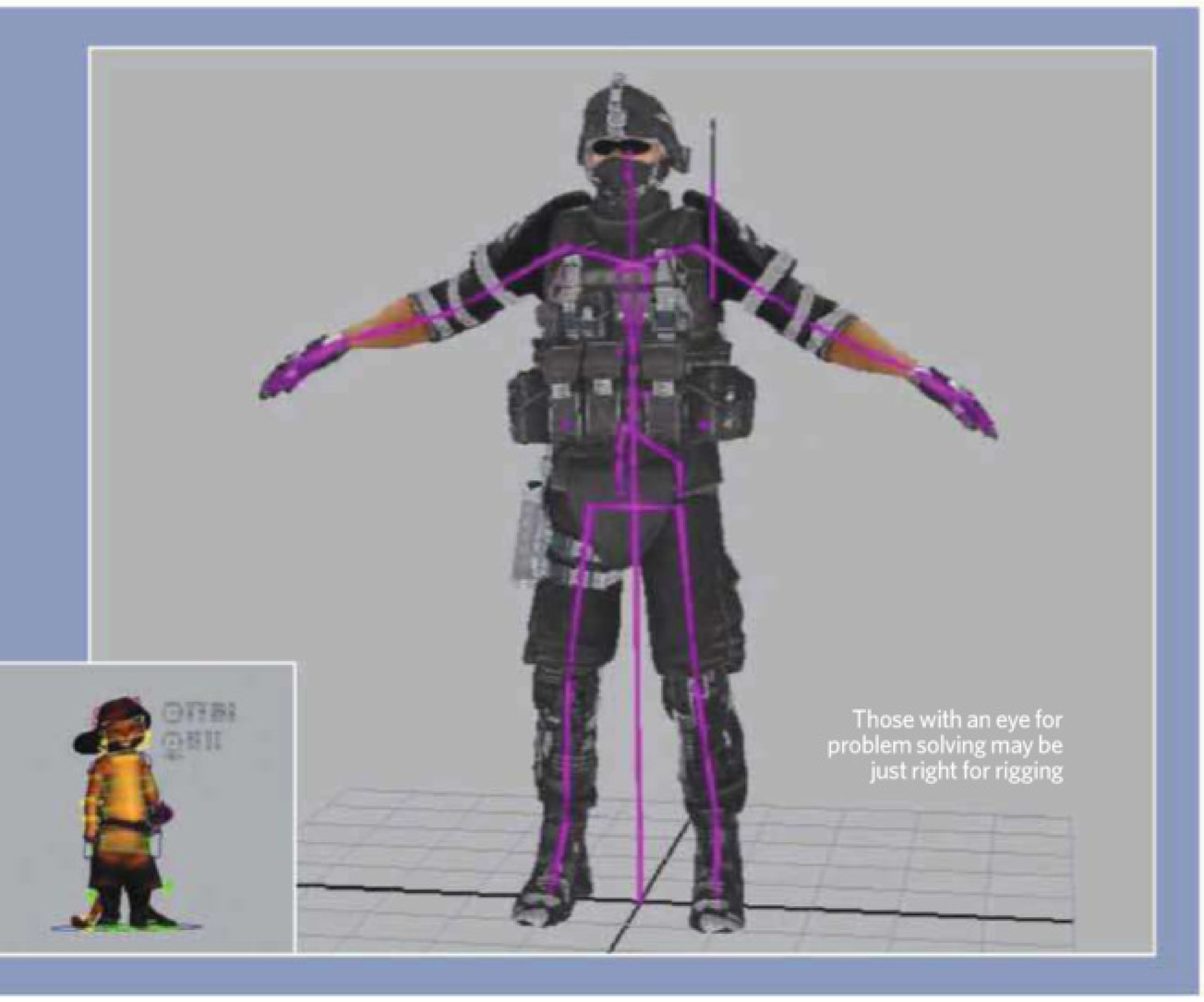
Rigging vehicles, just like characters, can be a complicated process – but straightforward if you do your research. This doesn't mean simply looking at CG vehicle rigs to see how others riggers have approached theirs (although this is also a good idea), but getting out there and looking at how vehicles work in the real world. How does the suspension work? Where do the wheels pivot from as the vehicle turns? Even sitting in a vehicle and taking in the effects of how it drives over different surface types will help inform you of what features will need to go into the rig. Once you have gathered this information, you should have pretty much taken all the guesswork out of how a vehicle should move. Then you can re-create in CG what already exists.

Once in the CG package, my approach is to first consider the broad movements. Let's use a car as our example. The translation and rotation of the body of the car, along with the wheels, need to be considered as there are direct relationships between these parts. Next, you need to go in and add the secondary layers such as the door controls or the ability to control the bonnet and the boot. Lastly, it's a case of adding extra details to allow the animator to add depth to the animation. For example, you may add automated controls to make the car seem as if it is affected by an uneven terrain. The animator can flick these switches on and off to add jitter to the car as well as control the intensity of that jitter.

autoJitter_ctrl
This control allows for automated jitter to be added to the vehicle. The attributes are driven by a series of expressions that in turn allow the animator to direct how much jitter should be affecting the car. It's very useful for adding an extra layer of animation texture once the main motion has been animated

attachToPath_ctrl
This control enables the animator to constrain the car to follow a path, which would be useful for animating the vehicle through a meandering environment

Tyre_ctrl
The tyre controls have a feature that allows the wheels to rotate automatically as the car is turned. This feature can also be disabled so the animator has full manual control. It's important not to dictate how the animator works. You should offer multiple options to support their style



RIGGING PROFESSIONALLY

William Torres ruminates on the importance of scripting when rigging

To be a professional rigger you should know MEL (Maya Embedded Language) and how to write expressions . MEL can assist with repetitive tasks that would normally take hours. You can also use it to write tools to assist the animators with your rig. Expressions, meanwhile, will help you organise your connections and make complex multiple inputs that can result in nice dynamic results. Math and equation knowledge will tie everything together. Once you have a solid knowledge base, you will be able to solve almost any problem.

✓ COMMUNICATE WITH THE MODELLER

Before you begin, speak with the modeller of the mesh and find out what may or may not change. Be prepared to replace a mesh in your rig later on. In addition, be aware of scale. Don't assume the modeller provided you with a model in the correct scale for the project. In many cases you must plan your rig so that the animator can change the global scale.

✓ NAMING CONVENTIONS ARE KEY

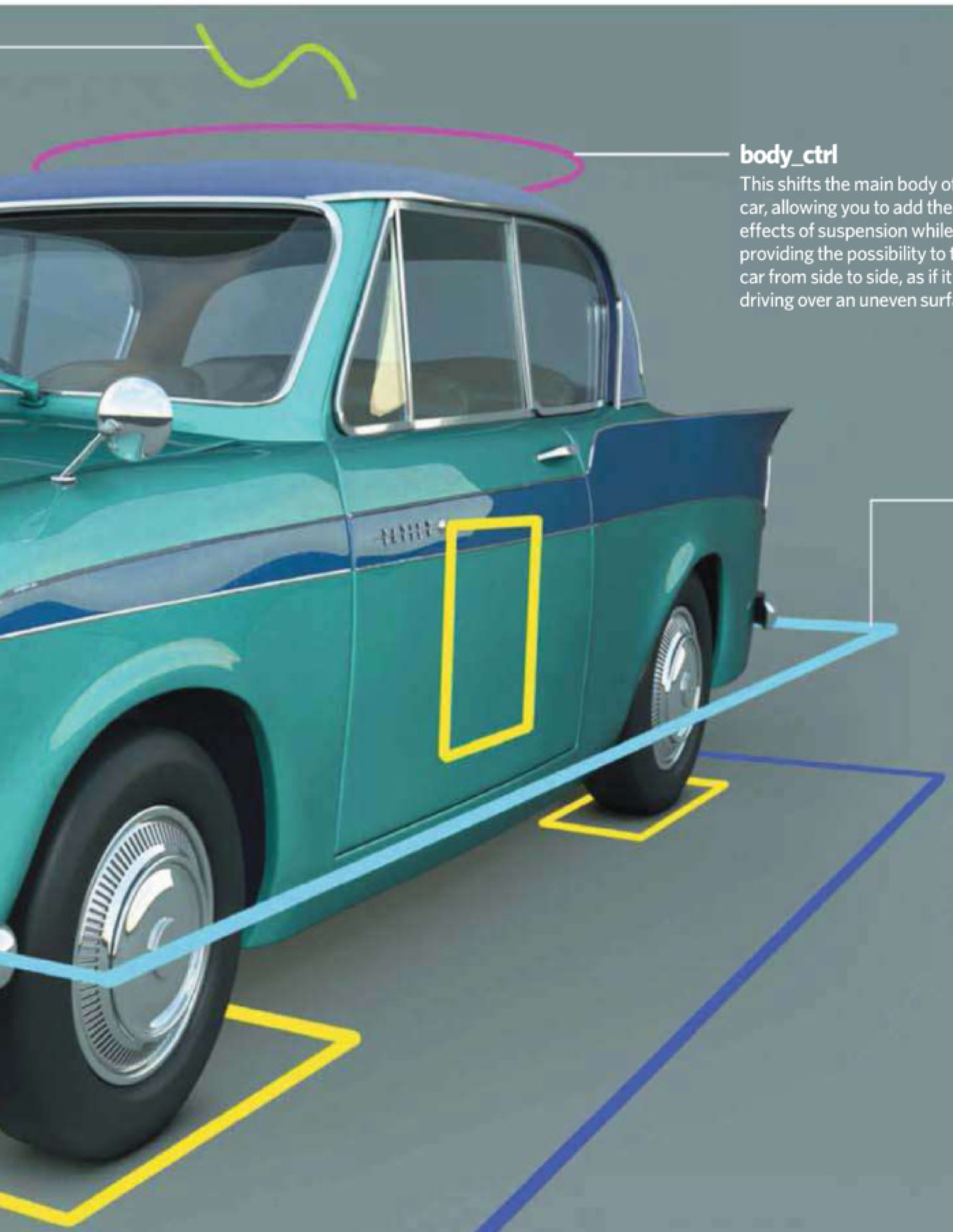
Give all your nodes – such as bones, controllers and so on – unique names. So, 'rHand_ctl' will not do, as many rigs may have a right hand control with that name. Provide an extra, unique pre or postfix to the name: 'bob_rHand_ctl'. This is important for so many reasons, including troubleshooting, transferring keys, point weights, geo-caching and more.

✓ FREEZE YOUR CONTROL'S TRANSFORMS

Make sure all of your control's transforms are frozen before adding to the rig. You want the animator to be able to zero out the rotation and translation of all controls to put the rig back into its default position. Failing to do this can cause the animator to waste a lot of time.

✓ KEEP THINGS CLEAN

Keep your Maya file clean. Organise all your assets in three or four groups (also with unique names). For example, 'bob_geoGroup', 'bob_skelGroup', 'bob_ctlGroup', and I like to use a 'bob_xtraGroup' to organise any extra nodes that don't fit into the others. Group all of these under one top group: 'bob_topGroup'. Finally, get rid of anything that isn't essential to the rig, like extra cameras, texture nodes, work in progress geometry and so on. You don't want to deliver a messy rig file – the rest of the team will thank you for it.



body_ctrl
This shifts the main body of the car, allowing you to add the effects of suspension while also providing the possibility to tip the car from side to side, as if it is driving over an uneven surface

main_ctrl
This is the main control used to animate the position and orientation of the car. Extra attributes are also in place on this control to allow the car to pivot at different positions, therefore allowing the animator to easily add drag

EVEN SITTING IN A VEHICLE AND TAKING IN THE EFFECTS OF HOW IT DRIVES OVER DIFFERENT SURFACE TYPES WILL HELP INFORM YOU OF WHAT FEATURES WILL NEED TO GO INTO THE RIG

JAHIRUL AMIN

Top tips

✓ DO YOUR HOMEWORK

Go to the source of what you are trying to rig, or find something similar, and get as much information as you can about the vehicle before hitting the computer. This will give you a good, solid grounding of how all the parts function as one.

✓ GIVE THE ANIMATOR OPTIONS

It's great to give the animator as much control as possible over the rig, but also allow for some parts to be automated. Better still, allow the animator to switch automated attributes on or off at their discretion. Wheels, for example, could automatically roll with the translation of the car or perhaps the suspension could automatically react to an uneven terrain.

✓ USE JOINTS

Take full advantage of all the tools available in CG packages. Joints and IK handles are useful tools to help re-create mechanical movement. Deformers can also be used to great effect to add the illusion that one object is pressing against another. The wheels, for example, could press against the road surface.

✓ THINK ABOUT CHARACTER

It may not have a face to show emotion but do think about the vehicle's personality and how you can bring it out through movement. Every vehicle from a car to a train to a plane has its own unique movement that gives it distinguishable character. Think about how you can give the animator control to bring these traits out.

Rigging explored

RIGGING AT DREAMWORKS

DreamWorks Animation character TD Wade Ryer reveals his approach to professional facial rigs

I'm working on an animated short called 'Late Night Lucha', the main character of which is Mr. X, a Mexican wrestler. Like all characters, he started with a sketch. I blocked out initial proportions in ZBrush using ZSpheres. I converted these to an adaptive mesh and then started sculpting using DynaMesh.

All good rigging starts with good topology. I took the sculpted DynaMesh into TopoGun to retopologise a mesh that could deform properly. ZRemesher works well, but for areas with detailed deformation, such as a face, you need the fine control of retopologising by hand. I ensured my edge loops around the eyes and mouth were optimised. With a decent resolution of my mesh to rig, I saved out the mesh to sculpt blend shapes in ZBrush and rig in Maya.

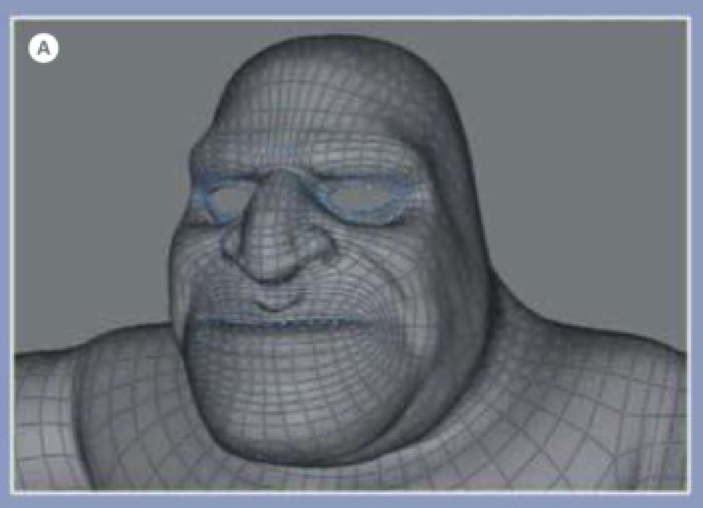
A blend shape is a target shape when a piece of geometry morphs from one shape to another. Mostly the geometry point count and point order must match. In facial rigging a blend shape will be used to shift between one face shape and another, like from a smile to a frown A.

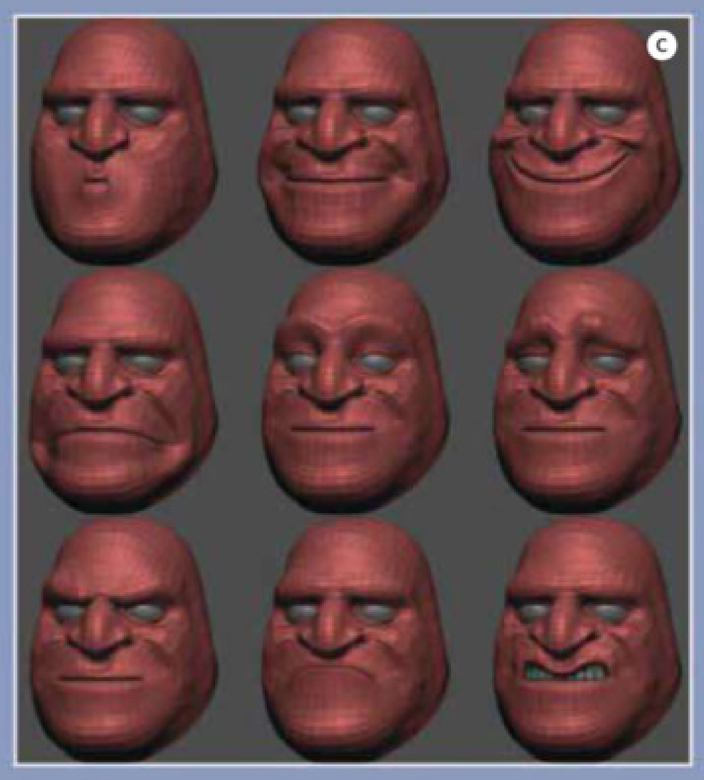
Using ZBrush's layers, I sculpted out various face shapes mainly using the Move brush. I created around 15 different face shapes. For my animated short I wanted a rig that could quickly hit the facial poses I was looking for, but also not as complicated as feature film rigs B.

I took my face shapes into Maya to be hooked into the rest of the character rig. I separated out my face shapes to left and right sides and then blended them from left to right for a smooth transition.

Along with blend shapes, I also used bones for the jaw opening and eye blinks. I used a lattice for the squash and stretch of the head, then connected the attributes into a basic set of sliders so I could animate the face shapes C.

After the rig is done I test it out to make sure that it can hit all the key poses, with a range of expressions D.





BEHIND THE CURTAIN

Of course, while rigging is clearly a fundamental and crucial part of 3D animation, there are always tasks that might better benefit from a different approach. "I guess this depends on what you're trying to achieve." Amin ponders. "Consider an example of having cloth elements as part of a character. It may be easier to run a set of bones through the geometry so the animator has full control of the assets, which would be suitable for stylised projects. However, if you are aiming for realism, then using cloth simulation may be the way forward. It's always worth testing out different methods and then picking the right tool for the job."

Movies often require a huge variety in approaches due to the diverse number of shots required. "Sometimes there is one shot that requires a character to hit a very unique or extreme pose that is not used anywhere else in the movie," says DiLallo. "Examples of this could be a character's face puffing up as if it were having an allergic reaction, or doing some extreme squash and stretch beyond the limits of the rig. In these cases I've found it is better to not try to build the capabilities into the rig, but let the animators use in-shot tweaks, which allow them to deform the characters in a more free-form way outside the constraints of the rig."

Whatever project you're working on, however, such an intense day-to-day role can inevitably affect your enjoyment of the entertainment that you help to create. "As a rigger, it is quite difficult not to see through the skin when watching films," says Amin. "When characters are created well, you can feel a sense of muscle and bone beneath the hollow CG shell. This adds an enormous sense of life and creates believability. Usually, the research gone into the development of these characters really pays off in the end product."

Geogehan feels the same. "Having an understanding of the magic that is rigging makes it very hard to see past it when playing games or watching movies – especially if it's done badly. However, when you are impressed it really inspires you to try and re-create what you've seen or come up with new methods that compete with it.

"On occasion something will be of such high quality though that you don't notice at all, and then can really appreciate the work that's gone into it. After all, it's what we want as riggers; believable experiences from the 3D world."

DiLallo is in agreement. "I know a movie is good these days if I don't think about how the characters were created, because if the story is not interesting, I start picking apart the CGI in my head!"

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The world of digital matte painting

We speak to some of the best digital matte painters in the business to learn about this crucial element in modern filmmaking and videogame design

Interviewees

Maxx Burman
Freelance matte painter / USA

Anthony Eftekhari
Concept artist and matte painter at Blizzard / US

Marco Iozzi
Freelance matte painter & VFX artist / Italy

Adam Kuczek
Freelance concept artist & matte painter / Shanghai

Tim Matney
Digital Matte Painter / USA

Frederic St Arnaud
Art director at Vision Globale / Canada

Sarel Theron
Freelance matte & concept artist / South Africa

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Setting the scene

Think of any science-fiction movie of the last 40 years and you'll be thinking of a matte painting – those amazing vistas that took you on vacation to a place that never existed, all hand-crafted by amazing artists on huge glass canvases. These days, of course, things are a little different. Entire scenes and backdrops are created digitally by equally talented technicians, but they're no longer two-dimensional slabs of colour. The modern digital matte painting (DMP) includes three-dimensional assets that enable a director to move a camera around within them, manipulating the shot however they see fit.

Marco Iozzi is a freelance matte painter who has previously worked at such studios as The Mill, MPC and Image Engine. Over the years he's watched the matte painting process change a great deal. "Digital matte painting is the evolution of the old traditional technique used in movie-making to create landscapes, environments and sets, which would be impossible or too expensive to create practically," he explains. "In the old days, amazing painters used to paint this on big pieces of glass. Eventually these images were combined with the live action to form the final shot."

"Traditional matte-painting techniques were superseded by digital matte painting during the mid-Nineties," adds Sarel Theron, a freelance DMP artist with experience in both movies and videogames. "It quickly became obvious that digital matte painting offered a lot more flexibility and could be created much faster. Initially they consisted of a few Photoshop layers that were projected onto flat cards in a 3D space to give the illusion of parallax movement and depth. Eventually it was discovered that projecting a matte painting onto full 3D geometry that roughly resembled the scene enabled for an even greater degree of camera movement and perspective change."

Maxx Burman has a great deal of experience in this regard, having worked on blockbuster movies as complex as *Iron Man 3*, *Riddick* and *Hotel Transylvania*. "This is what I usually tell people who don't have an understanding of VFX, digital art or film – you know when you see those behind-the-scenes pictures and it's actors on a stage, or in front of a greenscreen? Then you see the movie and they're in a different country, time period, or world? We paint that.

"Our craft and medium is in constant evolution. Now a static painting is rarely where the shot ends. Currently we face challenges of creating interesting camera moves, adding life and motion into these paintings and finding ways to immerse an audience in these environments more than was ever thought about – or even attempted – with traditional 2D matte paintings."

The world of digital matte painting

Creating a DMP

SAREL THERON DISCUSSES THE PROCESS BEHIND HIS STUNNING SENTINEL BAY IMAGE

Step 1: Get creative

I started out by creating a few concept paintings in order to see what kind of composition and colour scheme would work best. It's usually a good idea to nail down these aspects before you start working on your final matte painting.

Step 2: Gather reference

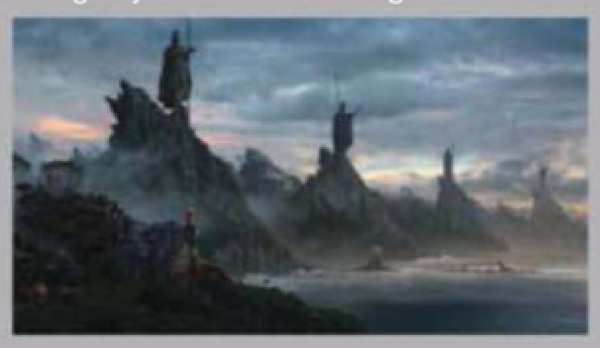
The next step was to gather the necessary photographic references. In this case I took the photographs myself as there is some really great scenery where I live. The photographic textures were then applied over the concept painting in Photoshop to help give the matte painting the necessary realism.

Step 3: Use Photoshop

The giant statues started out as line sketches and I coloured these in using the Clone Stamp tool. I sampled rock textures from my photographic references to convey the idea that they were originally carved out of the mountain itself.

Step 4: Add details

Finally I added elements such as fog and some finer details, including the lighthouse, cliff city and the figure you can see in the foreground.



THE DIGITAL PALETTE

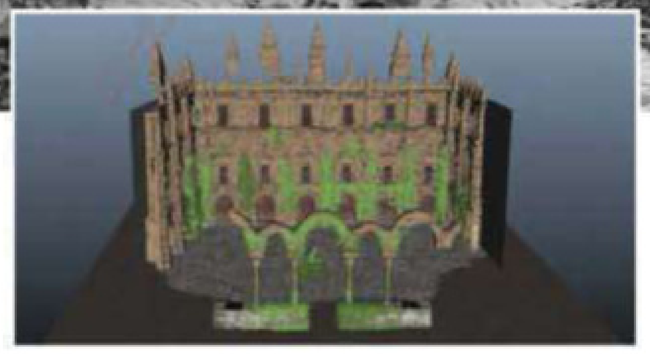
With incredible DMPs comes incredible talent, but also a heavy-duty load of software, knowledge and technique. Simply turning a vision into a fully functioning creation that can be manipulated by a film- or game-maker takes more than a keen eye and a paintbrush.

"If a completely new, fictional environment is required, then a project will always start out with some sort of concept painting or sketch," says Theron. "On larger projects you will typically work from an existing concept painting or moodboard that has already been approved by the director.

"A digital matte painter's main tool is Photoshop, but it's now also important for a matte painter to have some proficiency in a 3D package, as well as knowing their way around compositing software such as After Effects or NUKE. Once you have your concept sketch or film plate/raw render you need to collect the necessary photographic references and start the process of creating a photorealistic matte painting. Your final matte painting will be layered, usually with foreground, middleground, background and atmospherics on separate layers."

For Burman, the process and software requirements of a modern-day DMP shot depend on the project's needs. "However, for a simple matte painting with minimal camera movement and not a lot of 3D integration, it typically goes like this: I start by asking as many questions as possible, trying to get an understanding of a director or VFX supervisor's idea. From that initial discussion I create a concept, sometimes several, where I try to answer all of the questions that will come up throughout the matte-painting stage. I don't know who said it, but I live and love this quote: 'Practise safe design, use a concept'.

"Once the client has decided on a clear direction, I start the actual matte painting. I do all of this in Photoshop, but occasionally jump into software such as Maya to block in some perspective or lighting," continues Burman." After several iterations, and following client approval, I split up the painting into several layers to bring into NUKE. From here, I'll set up any geometry, projections, camera moves, moving elements and make any final tweaks before handing all of this information off to a compositor."



The Courtyard project

"To create this scene with the mood and lighting that I wanted, a set had to be built in 3D," explains Anthony Eftekhari. "This gave me complete control over the architecture of the building and the lighting design. The courtyard was modelled, textured and lit in 3D, then rendered out with several passes and Alpha mattes to help with the painting process in Photoshop. 3D vines and ivy were also created to add foliage to the architecture, to make the place feel moody and overgrown. Creating the set in 3D gives the artist control over how to design the shot and creates a solid base to add painting details and tweak the lighting in Photoshop. Matte painters are now being called upon to develop assets for their shots that will help to bring their paintings to a greater level of believability."

The Matte Department

"To create this believable fantasy cityscape, 3D assets had to be created," says Anthony Eftekhari. "In this project, buildings, props, palaces and ships were modelled, textured and lit in 3D and several different passes were rendered for compositing. This gives the artist the opportunity to create realistic lighting in 3D and rendering passes enable the artist to dial in the look of the scene with absolute control. It also enables big camera moves and flyovers, which you can't really achieve in 2D or 2.5D. Such 3D environments are becoming more common for matte painters." You can views the scene at **www.thematteddepartment.com**

You'll often see sweeping tracking shots moving through a DMP environment, as the 3D assets scale naturally towards the camera

Matte painting and 3D

ADAM KUCZEK EXPLAINS HOW 3D SOFTWARE IS USED IN THE MATTE-PAINTING PROCESS

Matte painters use 3D applications such as 3ds Max, Maya or CINEMA 4D for a number of reasons. First, any architectural elements are much easier to lay in, arrange and render out of 3D software rather than being painted by hand in Photoshop. Depending on the amount of time available, textures can be assigned to geometry and rendered out, providing a solid base for further painting.

It's becoming increasingly common for matte painters to work with a variety of render passes, such as Colour, AO, Key Light, Z-depth for fog effects and depth of field, or Colour Alpha for easy selections in Photoshop.

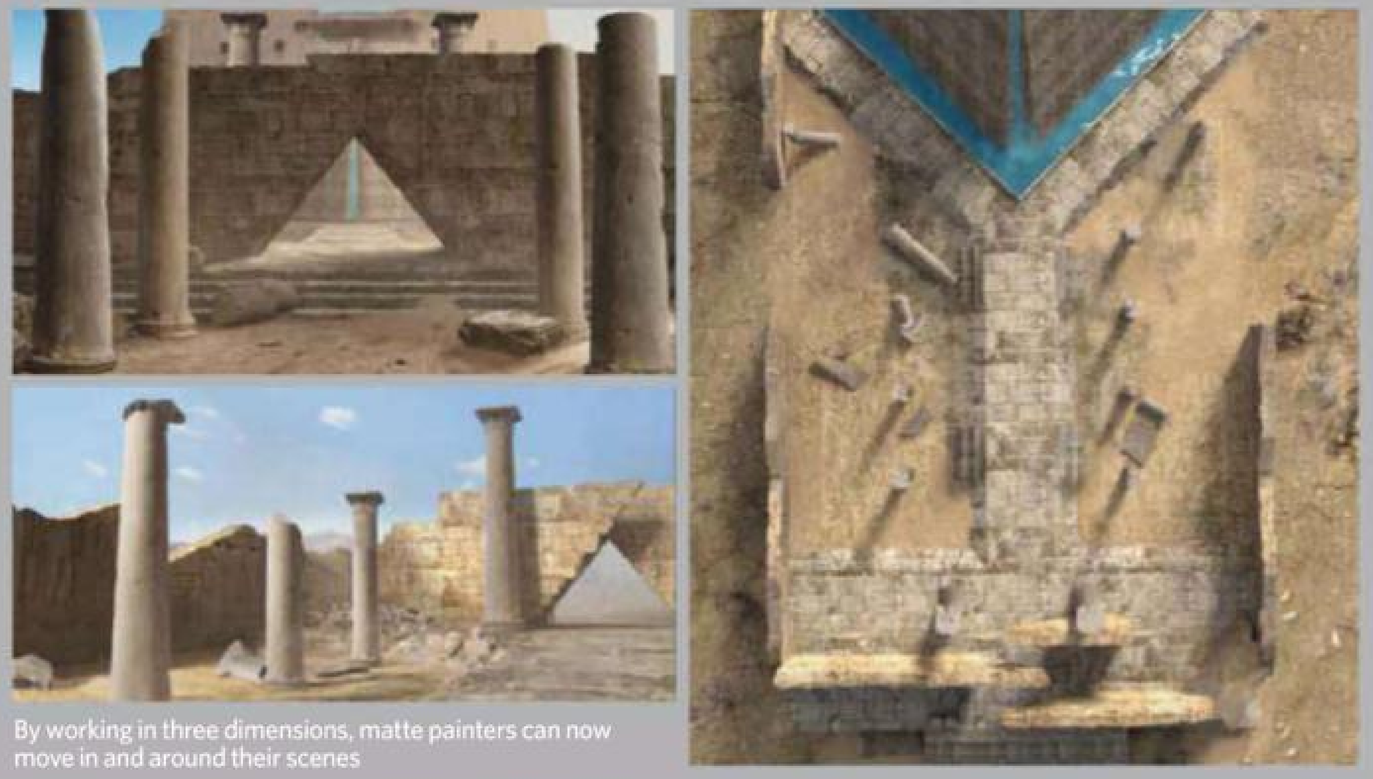
3D cameras also enable the artist to freely change the angle and composition of the shot. Many matte paintings shot nowadays are not static and that's where 3D comes in handy. Camera projection, or so-called 2.5D, is a technique where a matte painting is projected onto simplified geometry, providing all of the necessary details while also enabling some movement of the virtual camera. If necessary, in complex environment shots, 3D elements can be fully textured and rendered out to be used as foreground elements, but that's usually handled by a different department.

Vue

Vue is a software for creating and rendering realistic environments. Although you can create entire scenes in Vue and occasionally matte painters use it that way, personally I find it useful for generating particular hero objects, such as clouds, trees, rocks or landscape elements. They can be rendered out separately with an Alpha channel, and used in Photoshop as an addition to the matte painting. Vue's landscape sculpting is another useful feature, where you can shape the environment, pretty much like sculpting in ZBrush, and then export it into Maya or 3ds Max if necessary. Vue can also import Digital Elevation Models (DEM), which can be very useful for creating images based on real-life locations.

NUKE

NUKE is a powerful digital compositing software that can be used by matte painters along with Photoshop and their 3D app of choice, should they be compositing shots by themselves. Compositing is like an ultimate puzzle – you bring in all of the elements of the shot, such as footage; matte painting; 3D geometry with camera from your 3D scene; additional effects such as animated fog, waterfalls, blinking lights and so on. Next, you assemble them all into a seamless environment. Although this task belongs to skilled compositors, matte painters are usually aware of the process and are able to create at least a simple camera projection. This can be done by distributing matte elements in NUKE's space on flat polygons (cards) and/or projecting them onto imported geometry. NUKE's tools enable the user to create many effects such as depth of field, lens distortion, lens flares, chromatic aberration or film grain, which can make a shot look very realistic.



By working in three dimensions, matte painters can now move in and around their scenes

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The world of digital matte painting

Peaks and troughs

FREELANCE MATTE PAINTER MAXX BURMAN REVEALS THE PROCESS BEHIND THIS STUNNING WORK

The castle is a Smart Object referencing a separate 4k PSD. This allowed for a larger canvas with more pixels to work with, as well as speeding up Photoshop by splitting all the layers into two files.

Background mountains are lassoed shapes with loose brush work and scribbled detail to give a subtle suggestion of form, without taking the attention away from the castle and foreground mountains.

Daytime mountain textures were laid out and warped to match the contours of the approved sketch. Then all existing lighting was painted out and new shadows and highlights were painted in to match the sunset sky.

Challenge & evolution

Anthony Eftekhari has worked on DMP projects for film and television and currently creates backdrops for the vivid and varied worlds of World Of Warcraft developer Blizzard Entertainment. "The challenge on every piece of work is trying to create a pleasing image that helps tell the story. Things like composition, colour, design, lighting, form, atmosphere and mood all play an important part. I try to use these elements in a clever way to create a pleasing image and convey the story, while still looking believable and real."

Frederic St Arnaud has been working in VFX for 16 years and most recently has added titles as impressive as *Pacific Rim*, *Elysium* and *The Lone Ranger* to his CV. "For me, the main challenge – and also one of the most difficult – for matte painters is the achievement of photorealistic artwork combined with a great visual composition. Every action you take on a DMP always comes back to the same questions. Does it look real? Do I understand visually what's happening in the painting? Will everyone understand the intention? Will everyone's eyes lead and follow the same path? Is it beautiful? These are the questions that must be answered."

With technology evolving faster than anyone can keep up with and the demands of CG artists growing increasingly intense, it's vital for anyone in the DMP field to keep up with each and every change occurring in the industry. Adam Kuczek, who's currently working on matte paintings for the Wachowskis' new film *Jupiter Ascending*, has seen many changes in the last few months alone. "I think DMP is slowly turning from a somewhat standalone process to an element of full digital environments. The shots nowadays are becoming increasingly complex and involve a lot of 3D elements, greenscreen footage, simulations and so on. Particle systems in applications such as Houdini can create various environmental effects; procedural city generators such as CityEngine provide some really sophisticated urban-growing solutions; while stereoscopy presents a new challenge, since a typical flat matte painting won't cut it anymore. Matte painters need to keep learning new skills and adjusting their process to new demands and technology."

Eftekhari agrees. "The future of matte painting will definitely take on more 3D. Digital environments are becoming the norm, being the answer to some of the more complicated shots in film, and it's matte painters that are filling in those roles. Matte painters are evolving into environment artists, as digital environments can no longer truly be called matte paintings. This evolution will call on matte painters to become more generalist and have knowledge of 3D packages such as Vue. It's rare to find a job description now for matte painters without seeing 3D knowledge being required. As the demands of camera moves break today's 2.5D or 2D techniques, 3D will be the answer."

One of the toughest challenges for a DMP artist is ensuring believability. We've all seen greenscreen gone wrong, so ensuring natural and consistent lighting is very important

> As the demands of camera moves eventually break the 2.5D or 2D techniques, 3D will be the answer

Anthony Eftekhari, concept artist and matte painter at **Blizzard Entertainment**

Clouds are separated into different layers so that they can be animated in comp or swapped out for FX. They are created using cloud brushes for shapes, cloud photos as textures and painting with different blending modes for lighting.

Repairing a broken shot in post-production

TIM MATNEY REVEALS HOW HE USED DIGITAL MATTE PAINTING AND 3D CAMERA PROJECTION METHODS TO FIX A TRICKY HAND-HELD SHOT, CHANGING THE ENTIRE BACKDROP AND ATMOSPHERE OF THE PLATE IN POSTPRODUCTION

Step 1: Export the issue

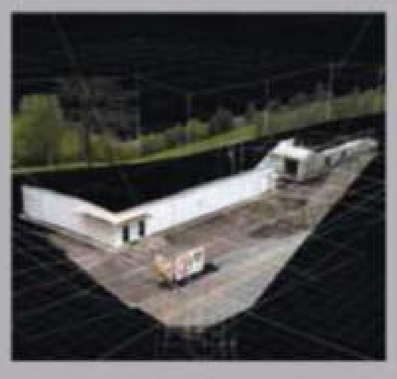
On this live-action shot, my job was to replace the entire background around a moving truck using 3D camera-projection methods. Because I would also be compositing the shot myself, and for ease of manipulation later, I chose to perform the projection entirely using The Foundry's NUKE. Once I created the matte painting and other 2D elements in Photoshop, the next step was camera tracking in NUKE. The resulting 3D Camera and Point Cloud were then exported to Autodesk Maya via FBX format.

Step 2: Move to Maya

In Maya I set up a modelling and test projection camera based around my matte painting and the first frame of the tracked camera. The projection camera's film had to be modified to fit the aspect ratio, along with the Camera Aperture settings, before I created an Image Plane to host the matte painting. It's vital to keep geometry for 3D projection simple, letting the matte painting do the bulk of the work. Also, keep your geo and UVs clean and well laid out to ensure a tidy projection.

Step 3: Return to NUKE

Back in NUKE, once I imported my projection geometry from Maya by FBX again, I brought the scene in through individual ReadGeo nodes per model. Next, instead of using the projection camera that I made in Maya, I chose to follow the same earlier step and simply duplicate my tracked camera in NUKE at the first frame. My Maya Horizontal and Vertical Camera Aperture settings had to be converted from inches to millimetres for use with the NUKE Projection Camera (multiply by 25.4).



Step 4: Create overlap

To enable overlapping areas and parallax, the geometry was then modelled for use with multiple matte-painting layers, which were broken out from the matte painting into individual images using Alpha masks. These were read into NUKE and connected to the ReadGeo nodes through Project3D nodes and the new projection camera. By using Alpha masks and simple geometry, I was able to give the impression of complex surfaces without having to fully model them, which sped up the entire process considerably.

Step 5: End with a comp

Whenever I'm allowed to composite my own matte-painting shots, I always leave all the final depth and colour correction of the matte painting to be completed during compositing. This is another of the advantages of performing 3D projection within NUKE: the ability to use its powerful tools for fine-tuning the matte painting to the plate, as well as being able to work at high resolutions and Logarithmic formats. How I replaced the truck's branding graphics is a whole other tutorial entirely.

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The world of digital matte painting

The new breed

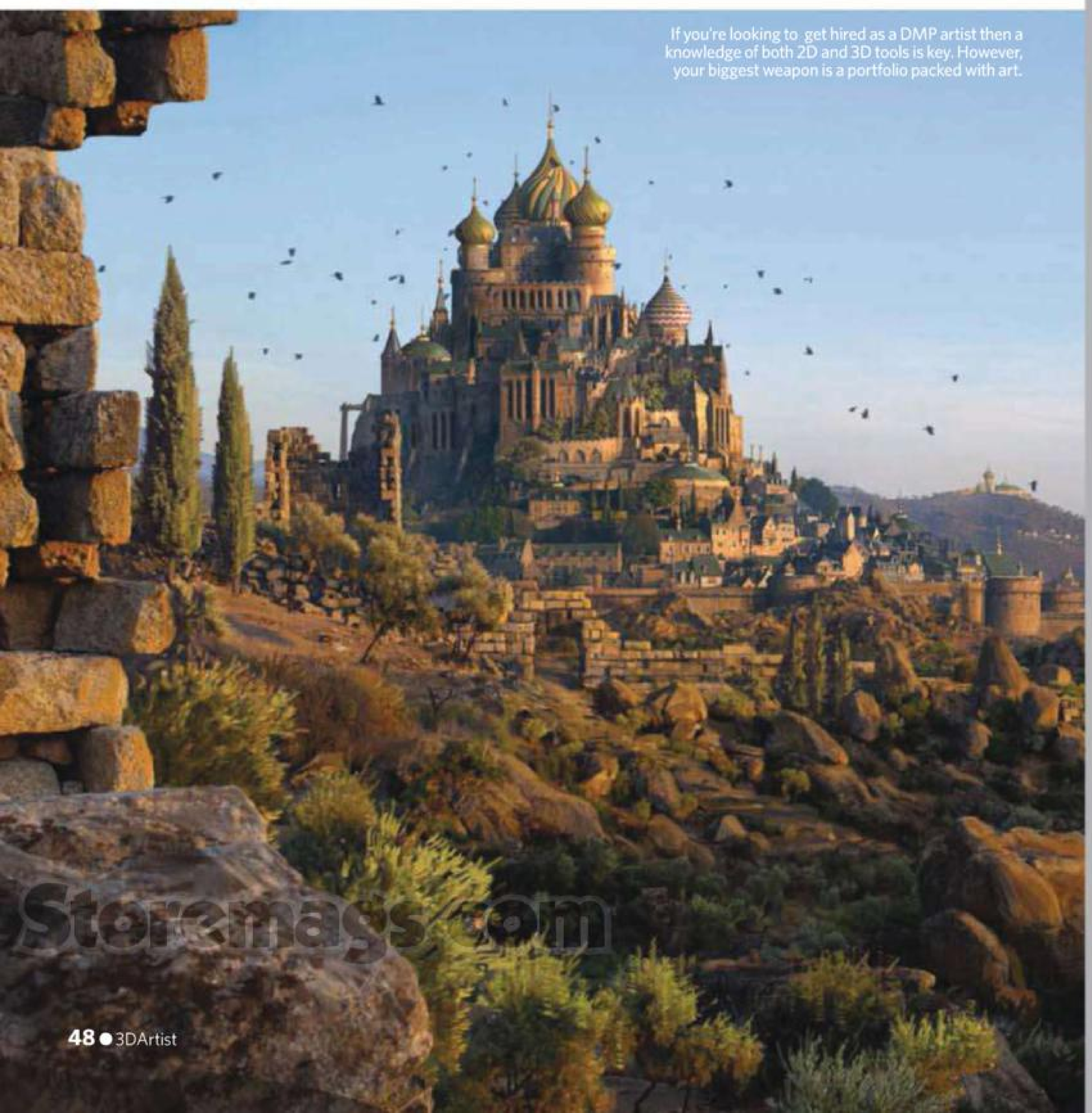
DMP is a highly competitive world, so breaking in requires more than a lucky job interview or a passing interest in the subject matter. Potential artists will need to come armed with a ready-made portfolio and demonstrable skill in numerous software packages before studios and directors will even look in their direction. However, the most useful tool in the matte painter's arsenal is shared by all artists – the eyes.

"You need good eyes and a good sense of perspective and colour," says St Arnaud. "You really need to be creative, as well as have mastered many different technical skills. You also need to be passionate. Never stop drawing and practising.

"You also have to learn and understand software such as Photoshop, Maya, 3ds Max or Softimage XSI. You also need to be your own judge and know exactly where you are according to other artists. Know what your weaknesses are and what you need to do to improve them."

Inspiring words and a clear example of what it takes for an artist entering this highly competitive but rewarding field. In a more practical sense, though, how does someone actually take those first precarious steps towards their dreams? "I got my first matte-painting job out of luck and perseverance, with very little experience and no qualifications." Burman remembers, giving hope to anyone with a dream and a digital paintbrush. "I was taking extension classes at Gnomon and I had been playing with DMP for years on my own, but I was far from good. The only thing I really had going for me was my passion and excitement! I wrote down a list of LA VFX studios, cold-calling and asking for an internship. I just wanted to be in a studio environment. After endless calls, Christov FX and Zoic Studios agreed. I interned at both and one hired me!"

For Theron, the job really is all about the passion for the art. He concludes: "I think it's important to remember that there is no magic formula, no secret software package that can make you a great artist. It all boils down to hard work and persistence. If you really want it bad enough and are willing to work hard to get there, then anything is possible. You can go to a great art school but you can learn just as much by yourself if you have the right motivation. To get your foot in the door in the film, television or the gaming industry your portfolio really needs to be up to scratch. Contacts, diplomas and degrees can help to some extent, but at the end of the day your portfolio will be the deciding factor as to whether or not you get hired."



If you're looking to get hired as a DMP artist then a knowledge of both 2D and 3D tools is key. However, your biggest weapon is a portfolio packed with art.

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Expert DMP

MAXX BURMAN DISCUSSES THE 2D PROCESSES BEHIND A SUCCESSFUL DIGITAL MATTE PAINTING

Step 1: Prep your plate

The first step to any of my paintings is prepping the plate. I start by finding my vanishing points; in this case there are two. I like to use the Pen tool to set anchor points and draw out my perspective lines. I keep this grid on the top layer of my PSD and will flip it on and off throughout the whole process. After getting my perspective, I mask out the parts of the plate that I'll be replacing. I use layer masks so I can paint visibly and invisibly.

Step 2: Rough sketch

I'll start playing with ideas very roughly with just a black brush on a grey background. I do a couple of line sketches until I find a concept I like, then start blocking in some rough lighting, avoiding use of colour at this stage. It's best to force myself through at least three sketches – by the time I get to the third, I have to start thinking out of the box and usually stumble upon a less obvious solution.

Step 3: Blocking

Once I have a concept locked, its time to start blocking in some elements. I'll lay in photos, very roughly skewing them into place and doing some quick colour correction. I find it's best not to worry about clean masking and perfect colour matching at this stage, so I don't waste time on elements that might change.

Step 4: Integrating, lighting & details

Now that I have all of my elements that will be used, I'll go through and mask them out nicely, correct the perspective and do a proper colour correction to get them seamlessly fitting into the plate. After all the photos are integrated, I'll go through each of the sections and paint in the highlights and shadows. I like to use Levels adjustments for both, painting layer masks to reveal bright and dark colour corrections.

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Step by step

Easy-to-follow guides take you from concept to the final render

Artist info

Dark Hoffman

Personal portfolio site www.darkgrafix.com

Location USA

Software used Vue Infinite, Photoshop

Expertise Concept art, designing props, environments, matte paintings

Build matte paintings in Vue

Neverland 2013

"Here we will look at how Vue and its various options can be used to create matte paintings for film or TV"

Dark Hoffman has been a digital matte painter in the film and commercial industries for over a decade

Learn how to

- Matte painting layout
- Make rocks in Hyperblobs
- Create a terrain
- Paint full EcoSystems
- Use MetaWater elements
- Make final adjustments

Concept

The image of Neverland is an iconic one used in film, television and on the stage. The purpose of this exercise is to create a look for the island that can be used as a matte painting for a blockbuster or a TV series. First we will create the look of the island in Vue and then take it into Photoshop for post-production work.

I've used all different types of software for my digital matte paintings, but Vue is the go-to program that I use when I can't find the right landscape, mountains, skies or foliage.

In the following steps I will explain how I use Vue for matte painting projects in the film and commercial industries. I'll reveal how to create terrains, a calm ocean and an extended landscape including Metablobs.

The outcome could be used as an establishing shot of an island to show where the next scene takes place. Usually these are pretty shots. As such, after the scene is rendered fully in Vue, I will take it into Photoshop CS6 and tweak the colour, make a Levels adjustment and add any small finishing touches to make it ready for the final shot.

With the Disc

Tutorial files:
- Tutorial screenshots

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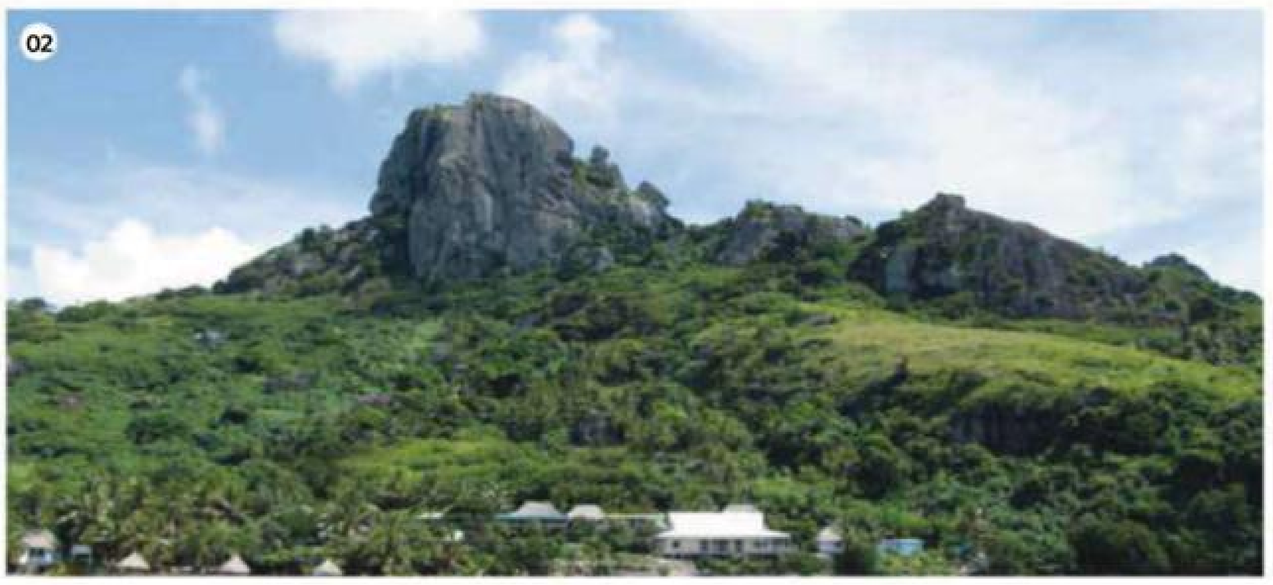
Design the layout

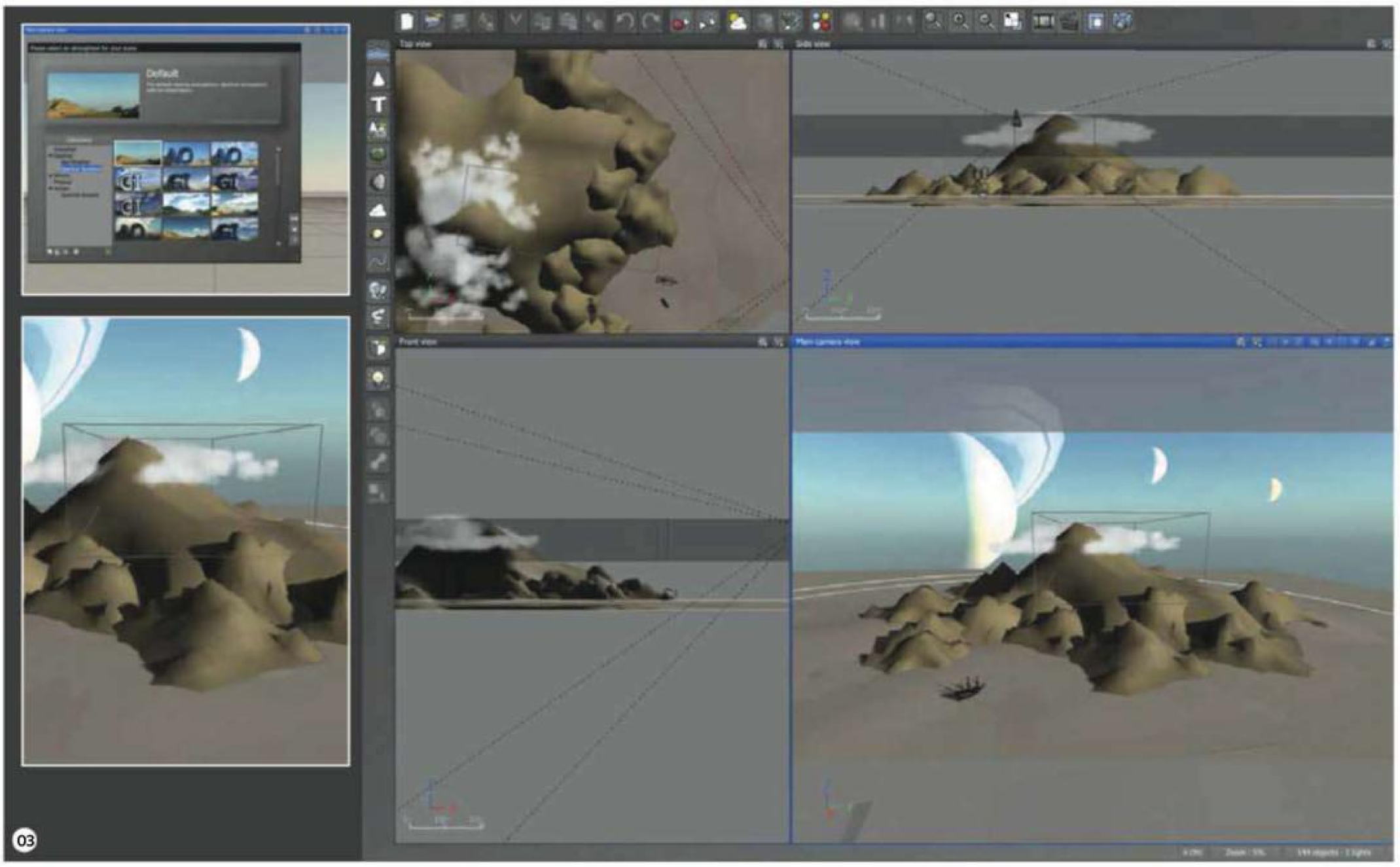
Establish the broad shapes of the new island

01 Create a new world The first thing that is needed to create an environment is an idea. Usually the production designer gives the art team the proper artwork to show what the world looks like. Colour, layout and a theme are very important to start a matte painting. Also we are normally given a plate or a frame of the film to start with, but sometimes we have to start from scratch, which is what we will be doing here in Vue. We'll lay in terrains from the Vue Library and edit them so they represent islands and mountains.

02 Find reference To make an impressive island you need to know what it looks like in terms of shape, texture and colour. You also need to decide what the look of the environment is, which includes atmosphere, time of day and where the ice will be placed in the scene. In our case, the script calls for 'an overall aerial view of Neverland as we fly towards it through the clouds. It's a tropical-looking island with coves, waterfalls and a snow-covered mountain in the centre. Captain Hook's ship sits silently in Cannibal Cove.' We can start creating the terrains by bringing in set terrains from the Vue library. We will then start laying out the central mountain and background with the terrain tools.

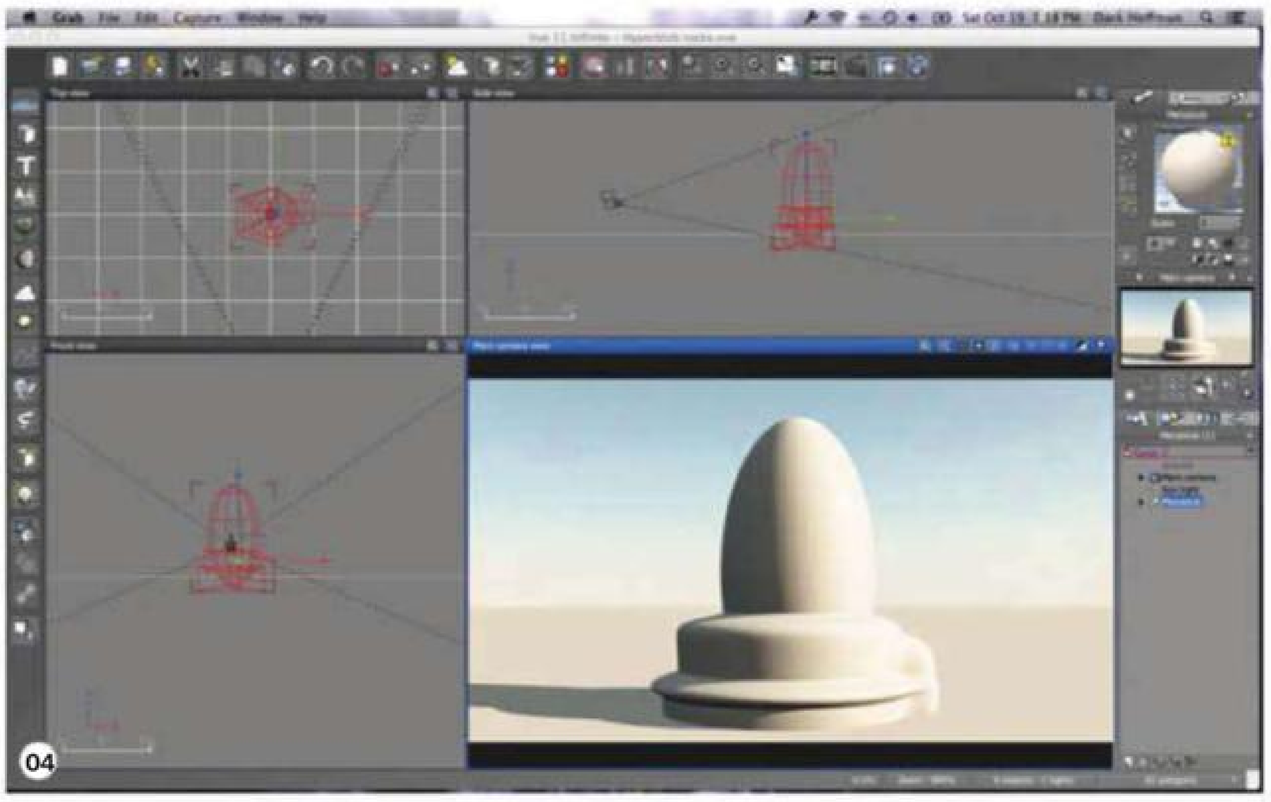
03 Set up the building blocks To help with the render time and to work with the scene in an easier fashion, we will open a default scene before we add an atmosphere. In our scene we'll start by bringing in a simple procedural terrain.





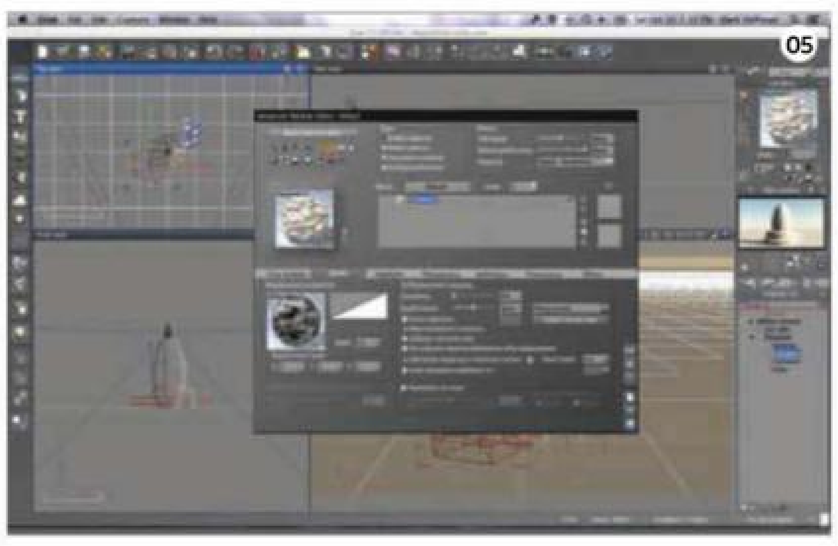
Set the scene

Unlock the beauty of Vue's evolution



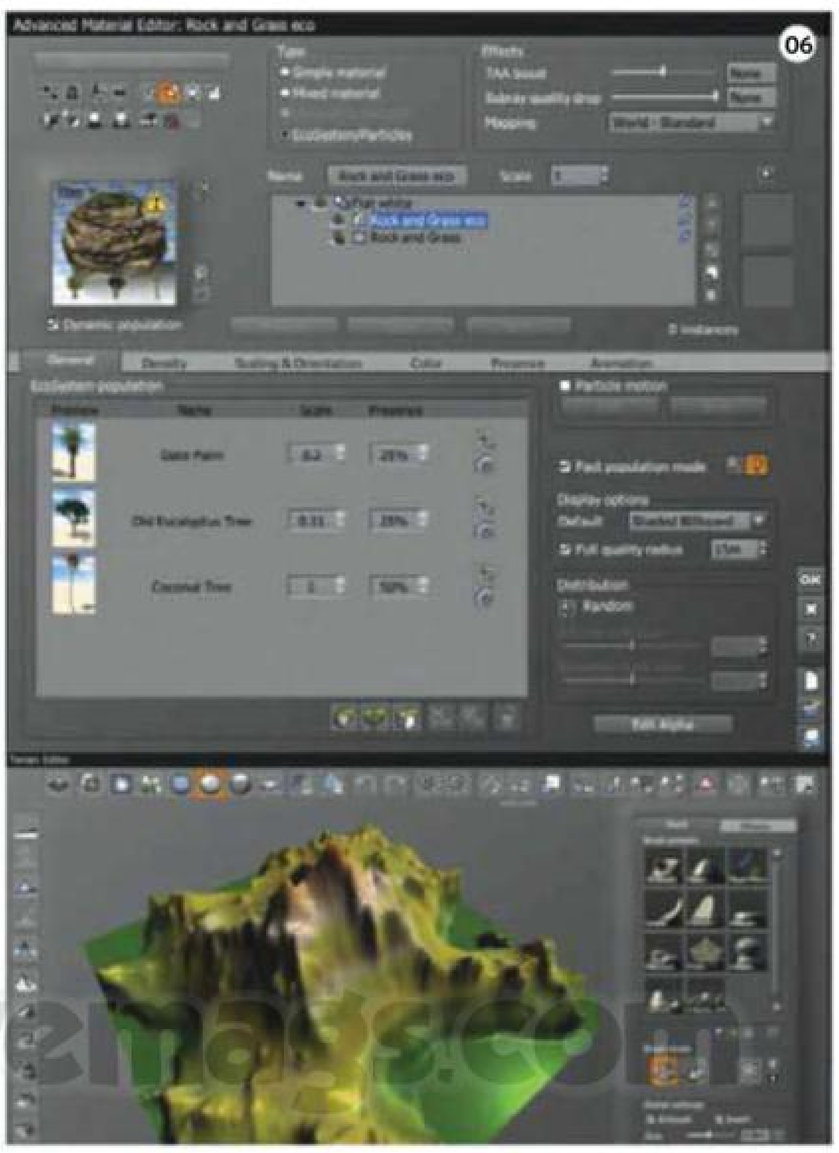
04 Work with Hyperblobs The next stage in the new version of Vue is building with Hyperblobs and Hyperterrains. You can stack these in any formation and any configuration of simple geometrical shapes and then simply select the Hyperblob tool. Pick the right Bump map and you have yourself a realistic-looking rock structure. Any material can be added for an even more photorealistic feel. You don't have to follow this shape exactly to build the rocks, but make as close a match as you can.

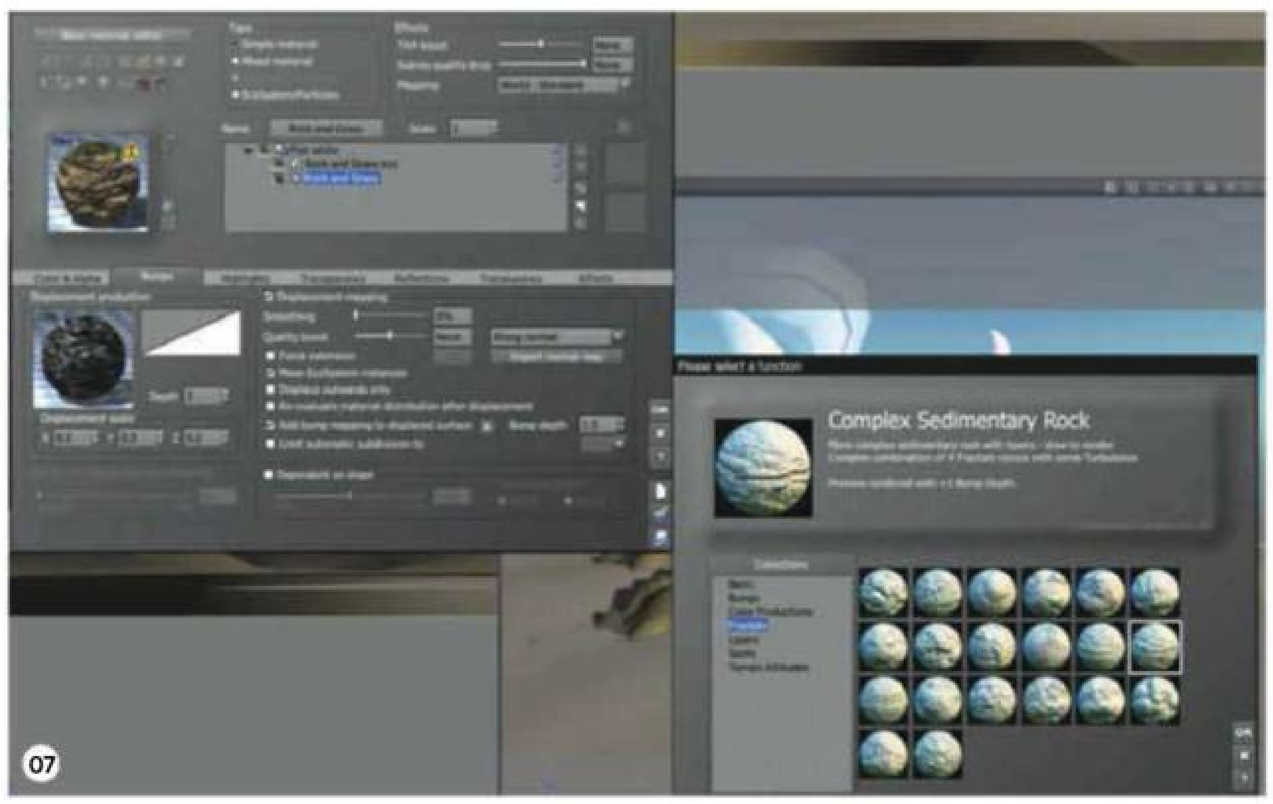
05 Group the shapes With the structure of the rock built, hit the Hyperblob button. This will group your shapes and create a blobby shape, one that looks closer to an actual rock shape. Double-click the Material Editor and hit the Bump tab. Select the ball and another box will open, which offers options relating to which Bump map you can use. Here we'll use Complex Sedimentary Layers, although you can try all the options if you wish. With your Bump map applied, change the scale so the arch appears larger and closer to the scale we need.



06 Shape the mountain Start adding terrain from the Terrain Library. When you've brought one into your scene, double-click the object and a new window will open where you can edit the terrain model. Click the left-hand buttons, jumping from dunes to mountains until you get a good shape. In the EcoSystem editor I also added three default plants – date palm (25% Presence) old eucalyptus tree (25% Presence) and a coconut tree (50% Presence).

07 Apply materials The centre of Neverland has a mountain with snow that goes down to grass and rock using a mixed material. You can play with which material you want to be used most. Here I made one island that I then used for various areas of the main island, meaning I didn't have to populate the main terrain with an EcoSystem and slow down the render. I named this island 'Neverland Cove' and saved it as a separate scene so when I need it, I can merge it into the main scene. Be sure to delete the Sun and ground that won't be needed.





Painting with plants

If there are certain areas that need to be populated with plants, you can just paint them in. Painting the flora will create a separate layer so it won't be attached to the terrain. Hit the Eco Paint button and choose which plants you want to paint. You can change the size of the brush and the scale of the plants to suit. The brush paints directly on any areas of the terrain, no matter its shape. This is a great way to add exactly what you need, where you need it.

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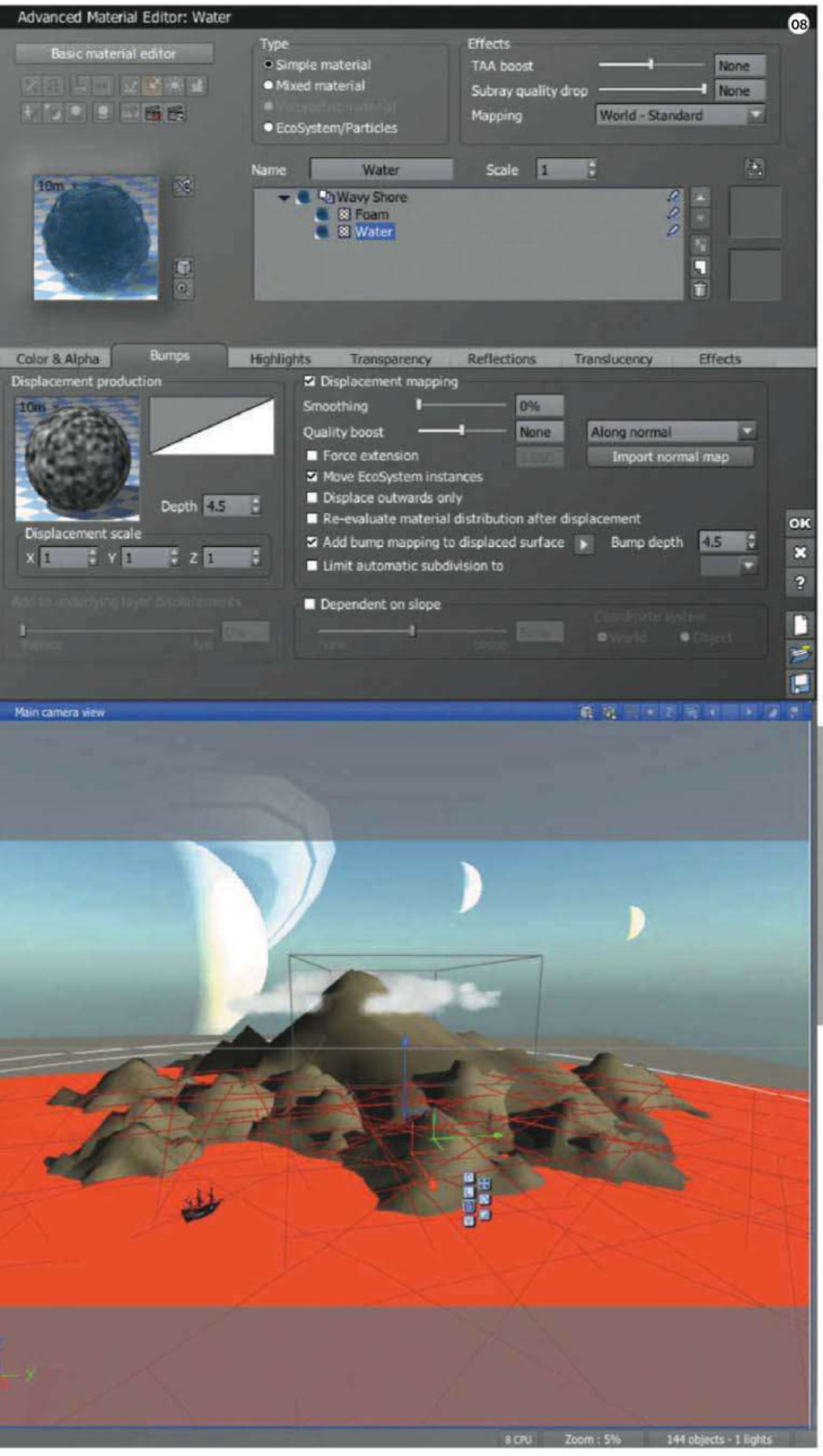
The ocean and beach

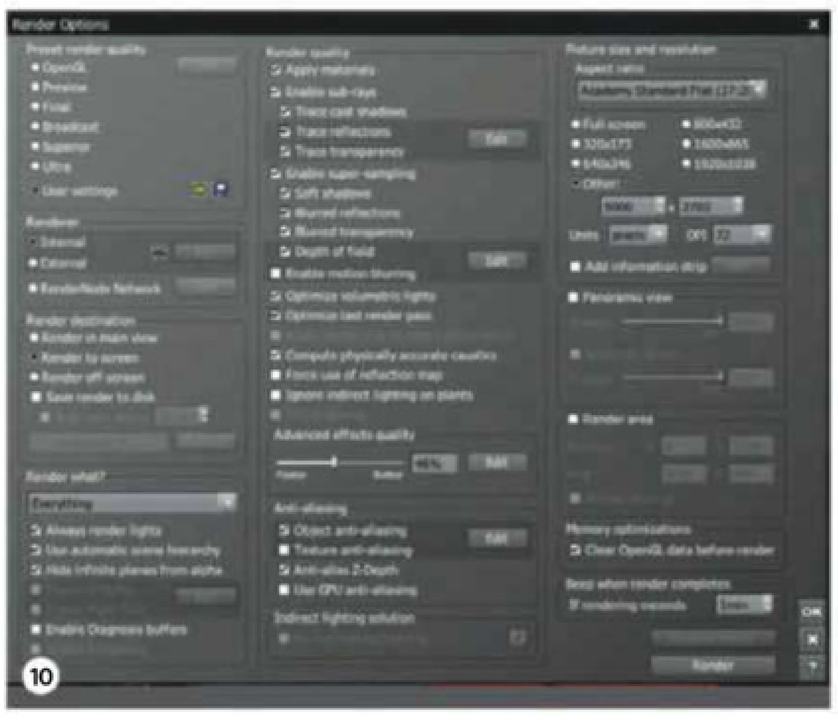
Build up a tranquil ocean and a sandy shore



08 Include MetaWater and scenic beaches Adding an ocean is just a click away in Vue and editing it is now even easier. Essentially we want shoreline foam, so start by selecting a MetaWater with Foam. To add a beach, select a simple terrain and flatten it, then add a sand material and make sure it comes through just enough to form a beach before sinking into the water. You can adjust how much of a beach you want, but in this example we just want the most sandy areas around the cove. Duplicate this and add it around the perimeter of the island where you want to see beaches and have them trail out into the ocean, so there's some overlap. This may take a bit of adjusting, but the results are fantastic and will really help to sell the realism of the scene.

09 Add planets This is probably the easiest part of the process and a lot of fun. On the left of the interface, in the menu bar, you'll find a thumbnail of Saturn. This is the Planets button. Click it and a planet will be added into the sky automatically. To edit this, go to the top-right of the screen and you'll find a drop-down menu from which to choose the planet you want, as well as its phase, colour and brightness.

10 Render time Now we're into the final stage of the Vue process. To keep the render time down to a minimum, turn off anything you don't really need, as well as anything that can be completed in post-production using Photoshop. Try to maintain a good balance between keeping render times down, while hanging on to everything you need.



Final touches

Input the finishing elements and move to post-production

11 Add Hook's ship For the pirate ship I added a model of The Golden Hind from Poser. You can use any ship from Cornucopia 3D or Poser, or any 3D model you have access to. I brought it in with textures and baked it, so it was compressed, then placed it in the cove. This is the only element in the scene that wasn't created in Vue. It can also be added later with Photoshop.

12 Take the image into Photoshop Now you can bring in the image rendered out from Vue and do some retouching in Photoshop. First let's play with the levels to bring some of the blacks in and help with the contrast. Desaturate the image a little, about 25%, then add a bit of colour back, mainly the blues. Following this, add a dark vignette around the image to add some depth and make it feel like it's out in another universe. All this will help sell the fantasy element of your image.

13 Place more elements Since we can see planets surrounding the island, we also need stars in the sky, which will be reflected in the ocean. I have a personal collection of starfields, but you can grab plenty for free online or paint them in yourself. I recommend you download a few and try them out. Pop them in the file and screen, then add a layer mask and paint out any stars over the island and the planets.

14 Final details For the final touches I added foam around the shores, as well as little waves. Vue can add these to the scene for you, but since our camera angle is so high it would be hard to see. I also added some small waterfalls around the island as a nice finishing touch. There you have it: a realistic image of Neverland.

40 hours creation time
Resolution: 5,500 x 3,700

• **DID YOU KNOW?** • All tutorial files can also be downloaded from: **www.3dartistonline.com/files**

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Artist info

Maciej Drabik

Website www.behance.net/brain_damage

Country Poland

Software used 3ds Max, Photoshop, V-Ray

Bio Maciej Drabik works as an art director at Sensis digital agency

"I wasn't really sure what these buildings should look like so I created lots of boxes to lock the base form in place before adding detail. I also used the Greeble plug-in to generate some more geometry"

Crater City 2013

Crater City **is my personal 3D and post-production training project. I'm a big fan of sci-fi and cyberpunk environments. My main inspiration was the comic book *The Incal* and the beautiful works of Stefan Morrell, as well as many other artists.**

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Maya | mental ray | Fusion

Step by step

Easy-to-follow guides take you from concept to the final render

Artist info

Iliya Atanasov

Personal portfolio site www.pixelhunters.com

Country UAE

Software used Maya, mental ray, Fusion

Expertise A CG generalist who focuses on ideas, art direction, lighting and compositing

Expert renders in 17 steps

Singing with dinosaurs 2013

"Here we will discuss the process of lighting and rendering in mental ray, for images that will really burst off the pages of your portfolio"

Iliya Atanasov Studio director and lead artist at Pixelhunters

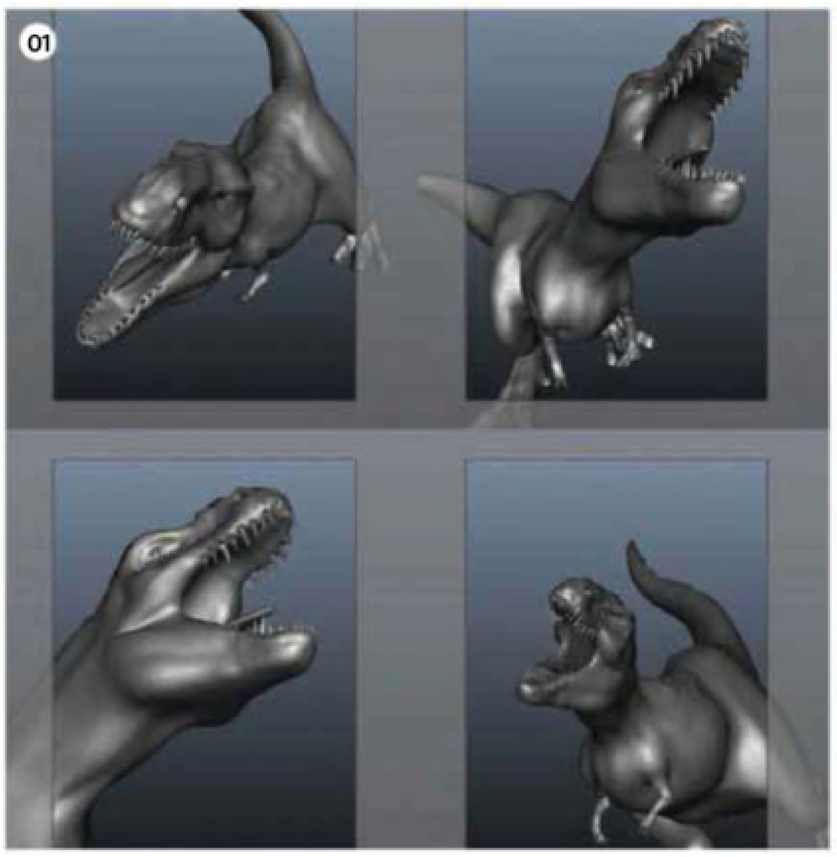
In this tutorial we will discuss the lighting and rendering process behind creating a finished piece of artwork, ready for your portfolio. The tutorial will mainly focus on rendering in mental ray, lighting and compositing, but we will also discuss some of the starting stages of the project. We will cover tips on how to prepare the dinosaur for the forest scene in Maya; the process of creating the materials with textures; how to create the light rig; and learn some useful tips and techniques on mental ray for Maya. There will be several passes rendered, including the separate colour, specular, reflection, fog, subsurface scattering, ZDepth and so on. These elements will then be assembled in eyeon's Fusion tool for composition. Finally, we will experiment with different colour corrections to achieve the final look, and add extra elements to bring life to the overall image. If you follow these steps in your own projects, you'll have some great looking work for your portfolio.

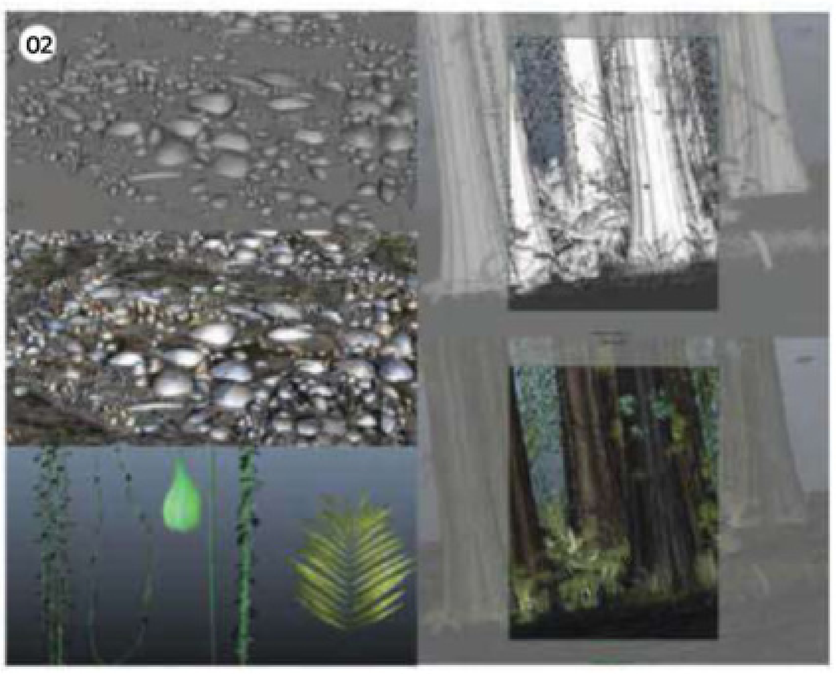
Prepare your models

Place your object in the base pose

01 Set up the models This dinosaur was modelled by Mike Semionov in Softimage and textured in ZBrush and Photoshop. Rigging, animation, muscle simulations and particles were completed by Anton Gonzalez in Maya. After the animation and simulations were finished they were baked to the geometry cache so it was easy to scrub through the Maya timeline.

02 Create the environment For the forest scene we created several bushes, trees and lianas. We created the lianas using simple primitives from Maya, extruding, scaling and moving the vertices. The leaves are polygon planes with a few spans with changed vertices to achieve the desired shape. We used Bend modifiers on the whole group to create the final shape. For the rocks, we created polygon cubes and modified the vertices for the final shape. We used Maya Paint Effects and Xfrog to create the trees that populate the scene. Wood mushrooms were placed on the tree bark, with shrubs and small rocks covering the ground. We grouped the objects and duplicated them using Transform to populate the environment with foliage.





03 The texturing process To create a dinosaur you need several textures, but depending on the render engine and the type of materials, only some of these can be used. The most important ones are the Color texture and the Displacement texture. As we are working with a large render with close-up shots, textures must be a large resolution – 8k for Color textures and a 32-bit Displacement map for the dinosaur body. From the Color map you can extract the Bump, Specular or even the Reflection map. For the trees you can use loopable bark textures, both for the Color and Bump maps. Procedural fractal textures are perfect for adding displacement on the tree bark. For the leaves, procedural ramp textures can be used or real leaf textures with an Alpha channel for the transparency. For the ground we used a photo texture of rocks and gravel.

With the Disc

Tutorial files:

- Tutorial screenshots for settings and reference

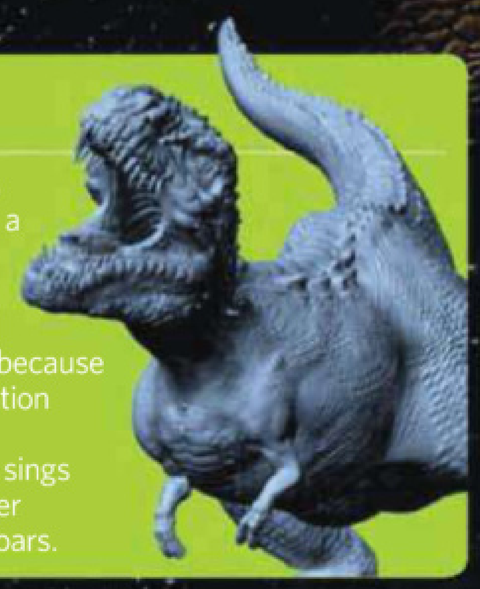
Learn how to

- Light and composite finished artwork
- Prepare the model inside a CG forest
- Choose composition, pose, and prepare the elements
- Modelling of the small elements such as trees, shrubs and rocks
- Prepare the lighting for the scene
- Composite the final render passes

Why set up a wide area for the camera?

The main focus is the open mouth. We want to accentuate the roar. However, in the process of creation, changes can occur, and the composition might shift from your original intentions. Therefore, a good rule of thumb is to make your camera frame as wide as possible, so you can keep the information from the image's sides if you decide to re-composite the image later. In this case you can also set up a larger render resolution, and crop out sections you want to focus on without losing any of the quality.

Concept



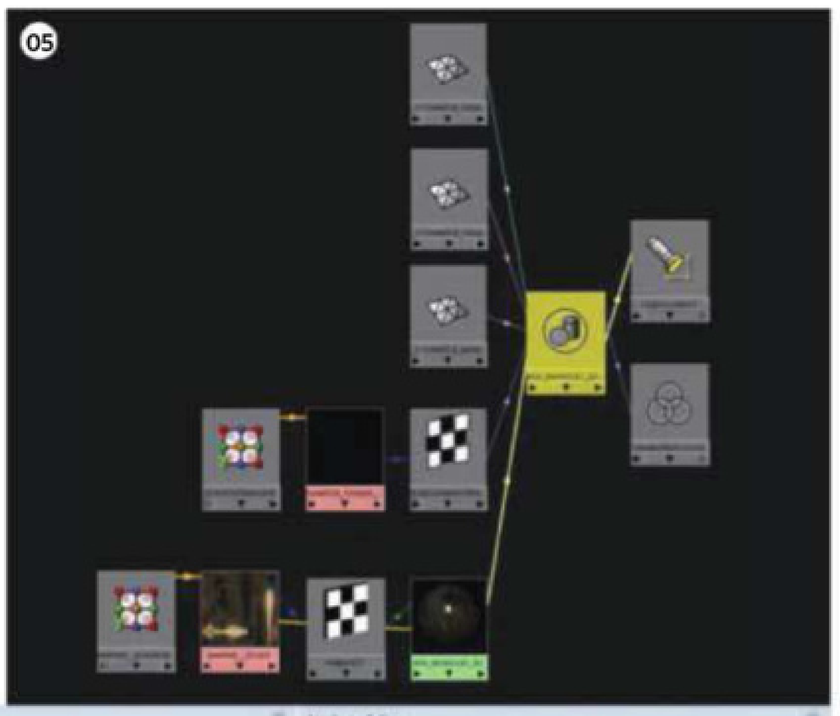
The idea behind this image was to create a dinosaur that, despite its scary look, also expressed character. This was because in the original animation (**tinyurl.com/PixelhuntersRoar**) it sings *Carmen* by composer Georges Bizet as it roars.

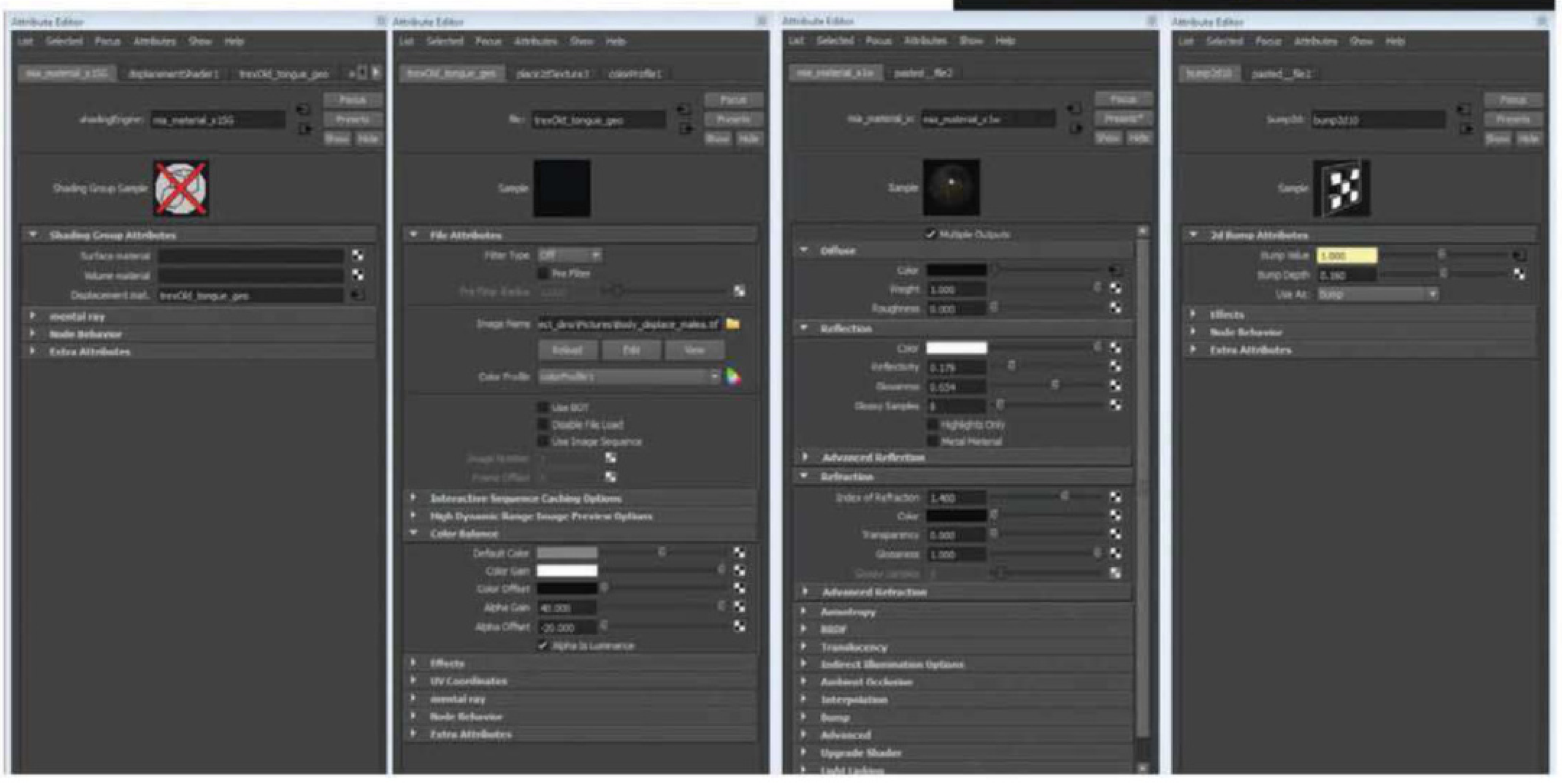
Materials and textures

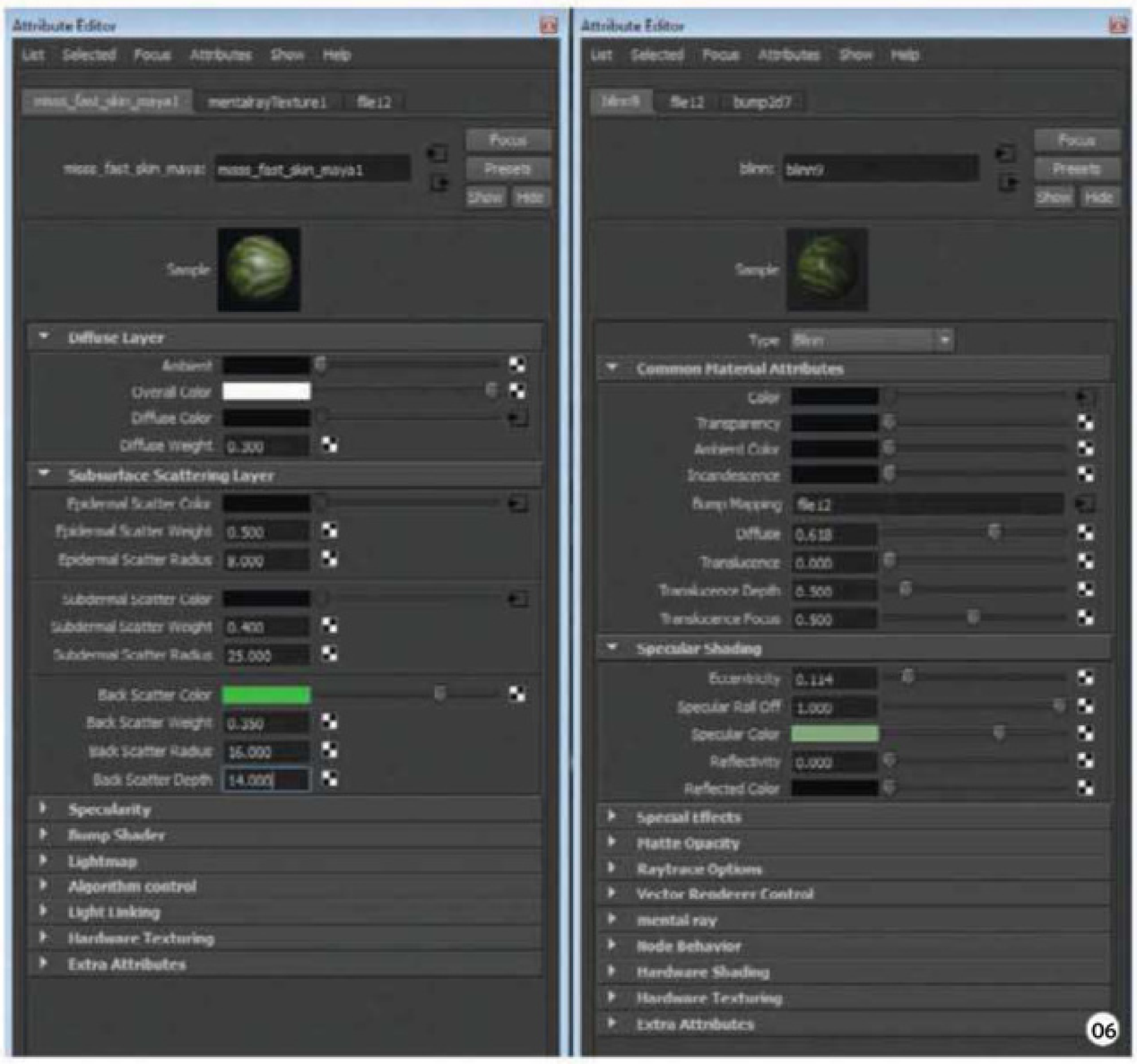
Achieve the right look for your creature

04 Body language and composition Dinosaurs have rather large heads but, in contrast, very small eyes. That's why we've rotated the head in such a way so that the eye area is more visible to the viewer. Remember that good eye contact always makes for a more exciting render! Later on in the process we will also increase the brightness of the eyes to increase the impact. You may also decide you want to see more of the dinosaur; not just the head with the teeth. If this is the case, you can raise the tail to twist behind the head, which gives you a better sense of the size and power of the creature – something else that will make the final render punch off the page. We also need to consider the shadowy, dark forest, and where sun rays will pass through the branches, making some parts better lit than others. For example, when we come to lighting in a few steps we will increase the visibility of the tail in order to better communicate the creature's massive size.

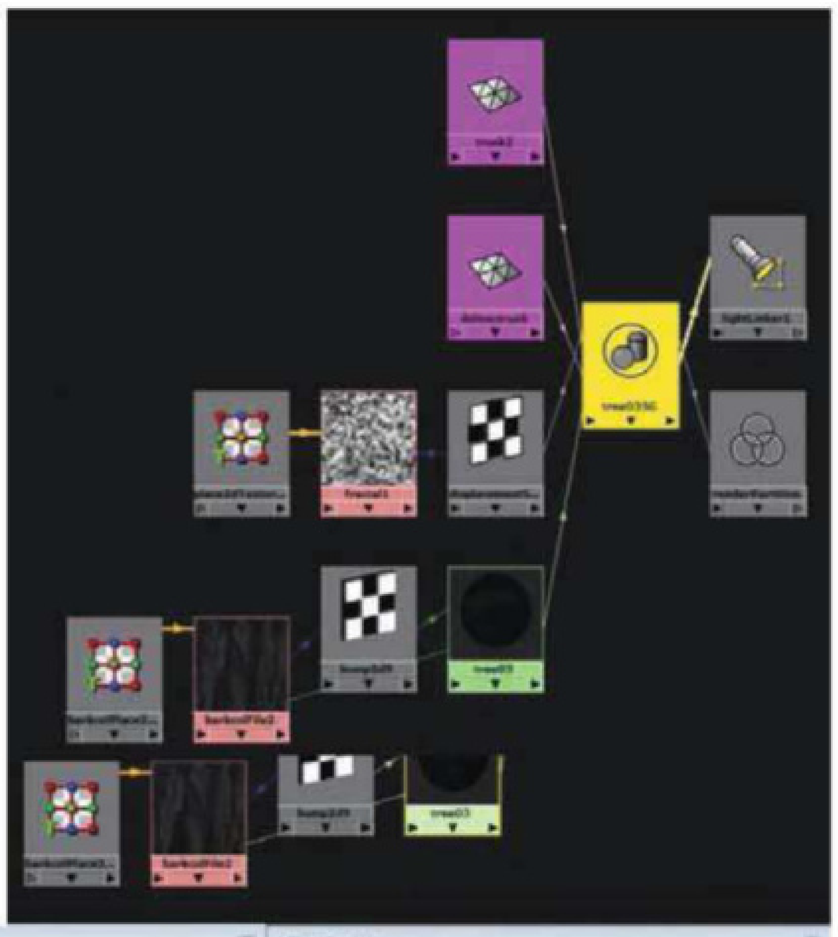
05 Decide on materials Since we will render using mental ray, the very best method for materials is, naturally, to use mental ray materials and specifically the Mia material X shader. We will need to set up different materials for the body, eyes, teeth and nails. Let's start with the body. Attach a colour texture to the colour attribute of the shader. Connect the Bump map to the overall Bump slot with small value of 0.16. Add some Reflectivity to the material at 0.179 and a strong Glossiness of 0.654. This will create some nice specular areas over the body of the creature. Since we are aiming for a darker forest environment, this will help a lot to exaggerate some of the body scales, especially on the darker areas of the skin. You can try to use a Gloss map with different dark and white splotches, but your rendering speeds will increase if you decide not to apply this texture. You can leave the Glossy Samples on 8 for static dark images such as this, as that will be more than enough. In the shading group node add the Displacement map to the Displacement mat. Now you are able to experiment with the settings of Alpha Gain and Alpha Offset. In this case the rule of thumb is to set up the Alpha Offset at a negative value, with the number itself half that of the Alpha Gain, so in this case you would use the following: Alpha Gain: 40, Alpha Offset: -20. Make sure that Alpha is Luminance is turned on. You might need to check the placement Texture node if it's necessary to mirror the UVs. It's also important to note that the values are very dependent on the scale of the scene. For the teeth material, once again use mia_materialX with higher Reflectivity at 0.236 and less Glossiness at 0.236, because in this case we want them to be shinier. Add a small Bump value to the teeth, at around 0.07. For the eyes prepare the same mia_materialX, but use a Color map with a Reflectivity of 0.24 and Glossiness of 0.9.







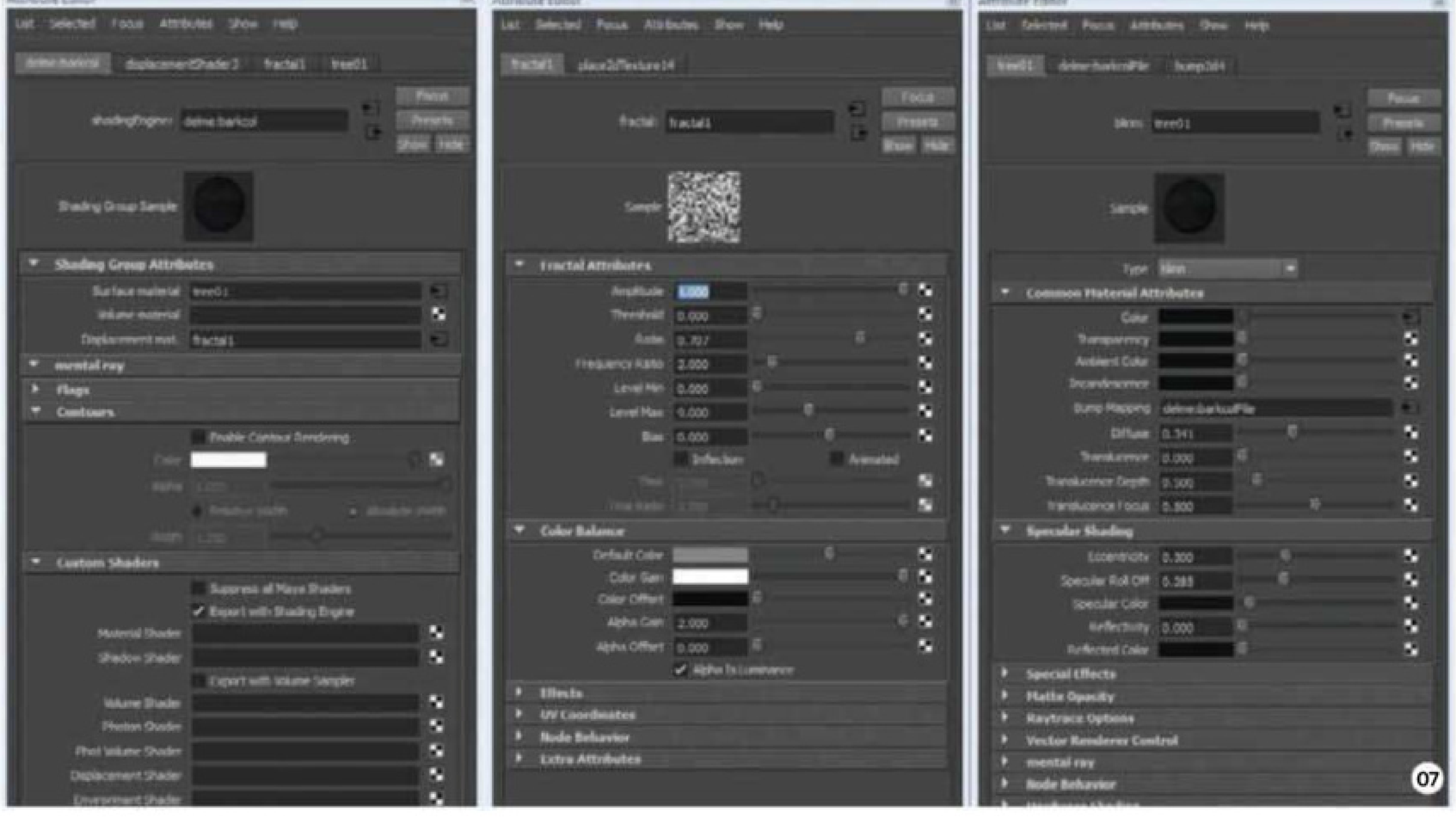
06 Materials for the foliage For the plants it's recommended that you use the subsurface material, because you can easily achieve great translucent results with this. Simply place the Color texture map on the diffuse colour attribute Epidermal Scatter Color. On the Subdermal Scatter Color, make sure you use a highly saturated version of the same texture. For the Back Scatter colour, use the following RGB values: 58, 220, 26. This will assure a nice green back scatter when we light the scene from behind. Bear in mind that the settings for the Back Scatter Weight, Radius and Depth are very dependant on the scale of your scene, so you will need to experiment with different values when you get to the rendering phase. Also keep in mind that SSS shaders take a bit longer for calculation than general materials, so you might decide to use SSS only for very visible/close-up elements in the shot. For most of the small leaves we will use the normal Blinn material. Add a Color texture map to colour attribute (if you have an Alpha in the TGA or PNG or TIFF image it will automatically connect to the transparency attribute). Add some bump to the leaves with a small value of 0.2.



07 Texture the trees and rocks We are going to use standard Maya materials for this step. Use a Blinn shader. Set the Bump Map value to 1 and lower the Diffuse to 0.341 so that the texture is not too bright. Set the Eccentricity to 0.3 and Specular Roll Off to 0.285. Specular Color itself is good with RGB values of 24, 24, 24. This will assure a subtle, bright specular feeling over the cylindrical shape of the tree trunks. Also, try adding some displacement over the bark. Use a fractal procedure with Alpha Gain set to 2 and Alpha Offset set to 0. Once again, you should try playing with these settings depending on how close to the camera the object is. As the number of trees in our scene will be high, it's useful to duplicate the material, delete the displacement connection and then apply it to the trees further from the camera. This will really help to speed up rendering time. The approach to the rocks is very similar. Use a Blinn material with slightly higher Specular value than that of the trees: Eccentricity: 0.3, Specular roll off: 0.203. Again, if you would like to make the ground darker, you could reduce the Diffuse parameter to 0.5 or more.

Camera lens

When creating a stunning render, you must think like a true photographer. Imagine you're shooting an actual image of a dinosaur. In this case you might need to use a big zoom lens – try it with 200mm. With such a long lens the head will look very big, and the neck and rest of the body will look thick as well. This will contribute to the impressive, domineering look of the character. You can compare this to the look of using a 35mm. Using this type of lens we will get a sharp foreground element – the dino head – with blurred background elements.



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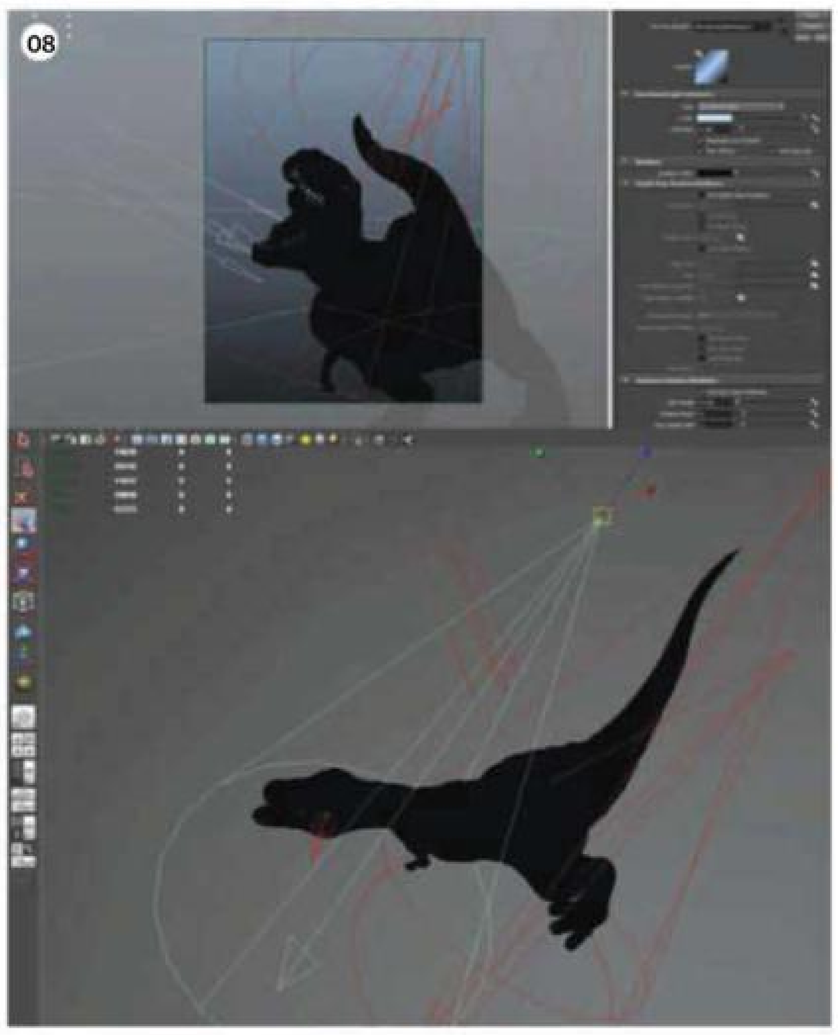
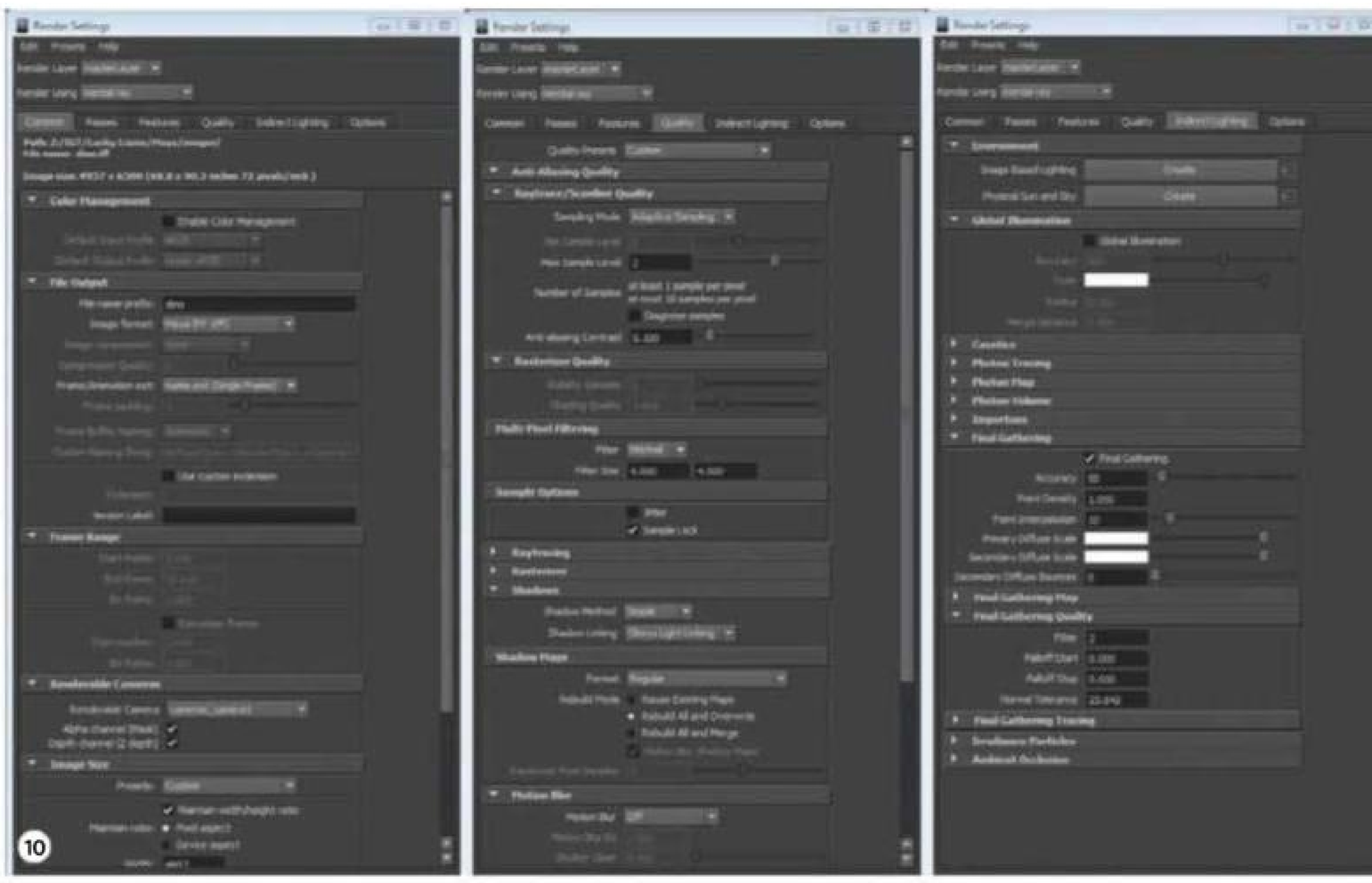
The lighting phase

Prepare a basic light rig for a dramatic final scene



08 Create the key, rim and back lights In this instance, the lighting we're aiming for is that of a daytime environment, but shrouded in dark by the canopy above. There are both shadowy and lit areas, and lots of volumetric rays that are cutting through the forest trees. We will start with a directional light behind the dinosaur's head with an Intensity of 0.9. Add a bluish tint by using RGB: 170, 208, 255. Smooth the shadows with a Light Angle of 5 and Shadow Rays at 5 to ensure a bluish rim around the edge of the creature. Use Spot Lights to light the front of the dinosaur. Place a Spot Light with a Cone angle of 34 facing the dinosaur head with an Intensity of 1 and RGB colour tint of 255, 241, 200. Use smooth Ray Traced Shadows with a Light Radius of 5 and Shadow Rays at 5 again. This will create the sense of yellowish highlights from the Sun. Repeat this procedure for the back of the body. For the tail add the same spot light but with a stronger Intensity at 6 and place the light just behind the tail facing towards the camera. This will light the top scales over the backbone and will offer a contrast with the surrounding darkness. Make another small Spot Light with a short Cone angle of 15 and Penumbra angle of 10. Set the Intensity to 1 with a pure white colour and No Shadows turned on. You can use this light to control the brightness of the eye by placing it so it points directly into the eye. Finally, put one big Area Light behind the trees with a small Intensity of 0.1 and the same bluish tint. This will add some wider column shadows on the back of the tree trunks.

09 Image Based Lighting Following a test render, you'll see that the shadows of the picture are still too dark. To equalise this, let's add Image Based Lighting. There are two ways of doing this. The first is to go to Render Settings and in Indirect Lighting click Image Based Lighting. The second way, which enables more control, is to create a simple poly sphere, scale it up to cover the whole scene and press Attribute Editor. Open the render stats and turn off Cast Shadows, Receive Shadows, Motion Blur and Primary Visibility. This will ensure that the sphere will not block the rays from the directional lights and it will not be rendered from mental ray. Let's apply a Surface Material to it and an HDRI image to Out Color parameter. You can use whatever HDRI images you prefer, but if the render is too bright, just reduce the Color Gain using Maya, as we want to have a rather dark and shadowy environment.



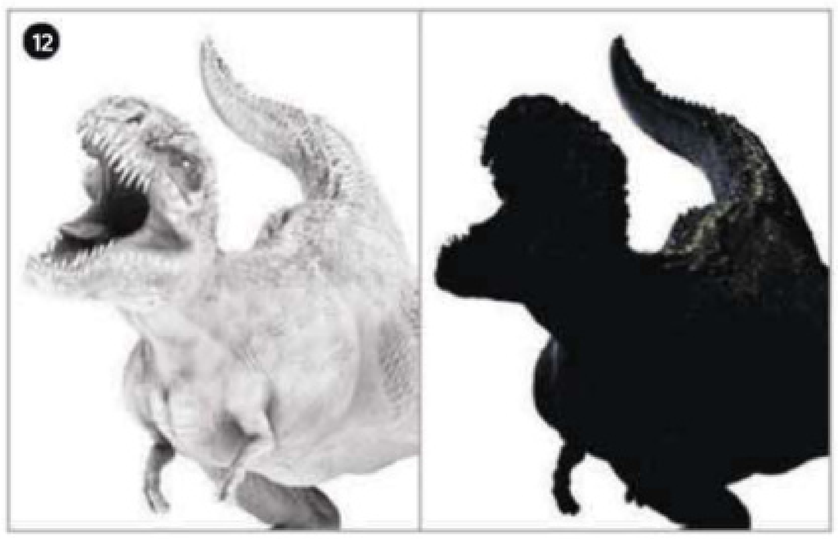
10 Render in mental ray Open render settings and click Renderable cameras. Check the boxes for both Alpha channel and Depth channel. Set up the resolution at 4,957 x 6,500 on 72dpi. Under Quality>Raytrace/Scanline Quality use Adaptive Sampling with Minimum Samples Level 0 and Max Sample Level 2. You can leave Anti-aliasing Contrast to 0.100 as we are creating a close-up portrait and blurred background. Use a Mitchell filter under Multi-pixel Filtering with a Filter Size of 4. This will slow down the render, but you will get sharper results. Under Raytracing reduce the iteration of Reflections and Refractions to 3, and set Max Trace Depth to 6. The most important elements are the reflections, as we are not using any refractions in the scene. Ensure that under Framebuffer the Data Type is RGBA – 4 x 8bit. Changing the colours, brightness and contrast later in compositing is better using 32bit, but for this purpose these settings will be sufficient. Under Indirect Lighting use only Final Gathering and no Global Illumination. If working on an animated sequence the Accuracy setting would need to be pretty high, but as we are rendering a static frame let's leave it at 50. As for secondary bounces, they will slow down the render a great amount and due to the many dark and colourful pixels in this image they will add little, so leave them set to 0. An important parameter to change is in the Final Gathering Quality tab. The filter must be set to 2. This will smooth the separate splotches/spots and with a small Accuracy setting we can achieve a nice blur around the edges of the objects. Under the tab Custom Entities you must also turn on Pass Custom Alpha Channel.

Render passes

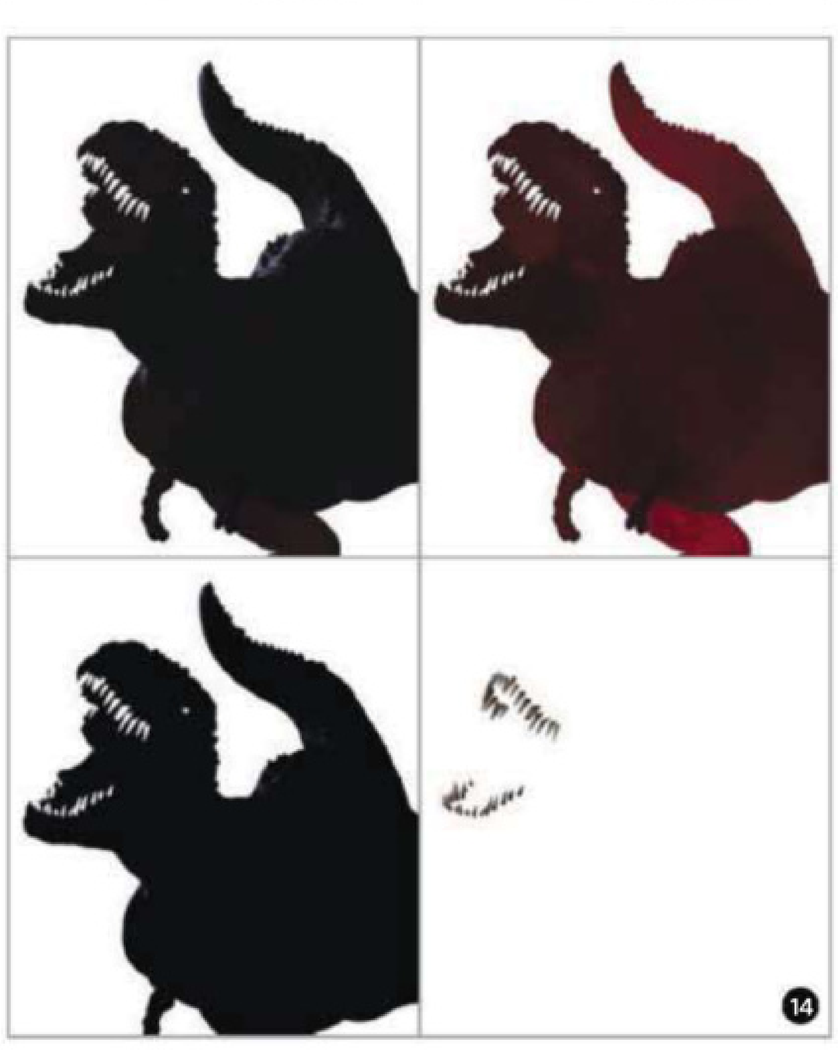
Create various passes for compositing

11 The beauty and ambient occlusion pass The first option when preparing the passes using mental ray is to use render passes directly from Maya with overwrite settings for the rendering options. Let's make a beauty pass and ambient occlusion pass using this method. We will use passes from the Channel Box/Layer Editor. Select all the objects inside the scene, apart from the lights. With the selection create a new layer and assign the selected objects within it. Create a default Lambert material from Hypershade, open the Attribute Editor and in the shading group node expand the Custom shaders so you can attach: mib_amb_occlusion1 within the material shader. Inside, change the Samples to 32 and leave Max Distance at 0. We have now created two of the passes: the beauty and ambient occlusion. Now go to the mental ray Batch Render option and click on Batch Render. Mental ray will create two folders with one file in each.

12 The shadow and specular pass For these passes we will create different scenes, as they will be easier to navigate and control. Delete everything inside the scene apart from the dinosaur and the back directional light. Create a usebackground material and apply it to the creature. Connect the original displacement file to the Displacement Material. Take out the Reflectivity and set the Reflection limit to 0. Set Shadow Mask to 1 and render to create a black colour file with shadow in shadowed areas. Next is the specular pass. Leave only the dinosaur with all the lights from the original scene and apply a pure black blinn material with Eccentricity set to 0.068 and Specular Roll Off set to 1. Add no Reflectivity and put the Noise Procedural texture into the Bump slot with a Depth of 0.01. This will ensure the specular pass won't look too plastic. You do not need any Final Gather or Raytracing, so turn them off and render.



13 The fog pass The easiest way to create this pass is to apply a Lambert material with Matte Opacity turned to Black Hole mode. From Maya Visor in Fluid examples drag skyFog.ma into the scene, and move and scale this container to fit the dimensions of the scene, then render it. Again, there is no need for raytracing, meaning the render will be very fast. For the saliva in the dinosaur's mouth you can stretch one cylinder object between the upper and lower teeth, apply a black Blinn material with Eccentricity set to 0.135 and Specular Roll Off set to 1, then render them separately. We will take only the specular information from them when compositing. For the light rays pass you can try two different methods – a 3D spot light with attached light fog and a procedural noise texture added to the Color or Density slots, or use a picture of some light rays and just place them on 3D planes. Both methods are fast for rendering.



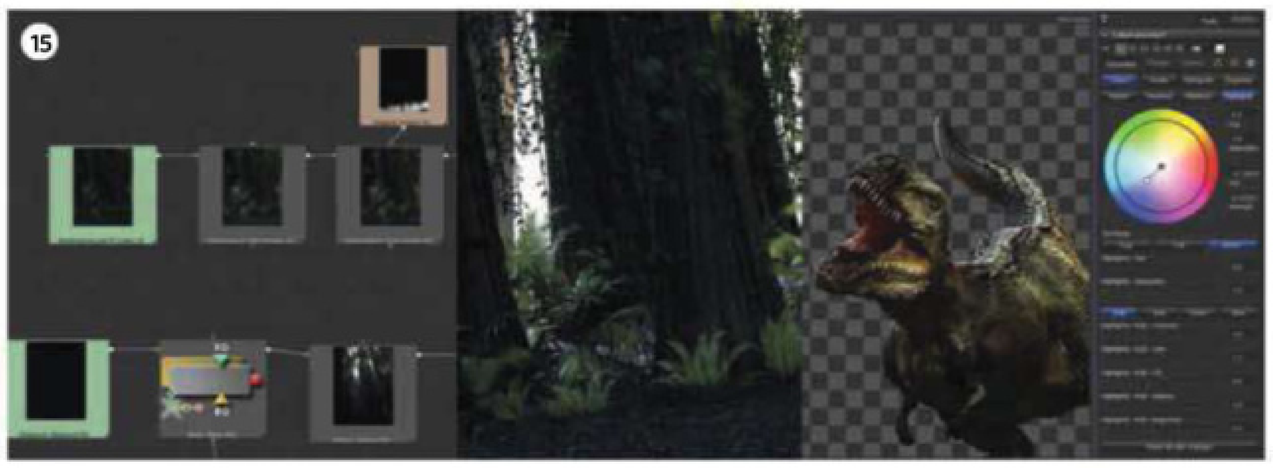
14 The subsurface scattering pass Adding some reddish subsurface scattering inside the dinosaur's mouth will add a sense of danger to the image. Render a separate pass for it, which you can mask later when compositing. Create a misss_fast_skin_maya material with a black ambient colour and settings of 0.5 and 8 for Epidermal, 0.45 and 25 for Subdermal and 0.99, 30 and 45 for Back Scatter. Leave only the back directional light in the scene and pose it to face directly towards the camera. All thinner tissues will gain a slight red tint. Create different passes with different settings for the depth of the scatter, giving you more options to experiment with in comp. You may also wish to render the teeth using the SSS shader as they are quite dark in the original render. Use the same settings, but change the Ambient Color to 220, 201, 168.

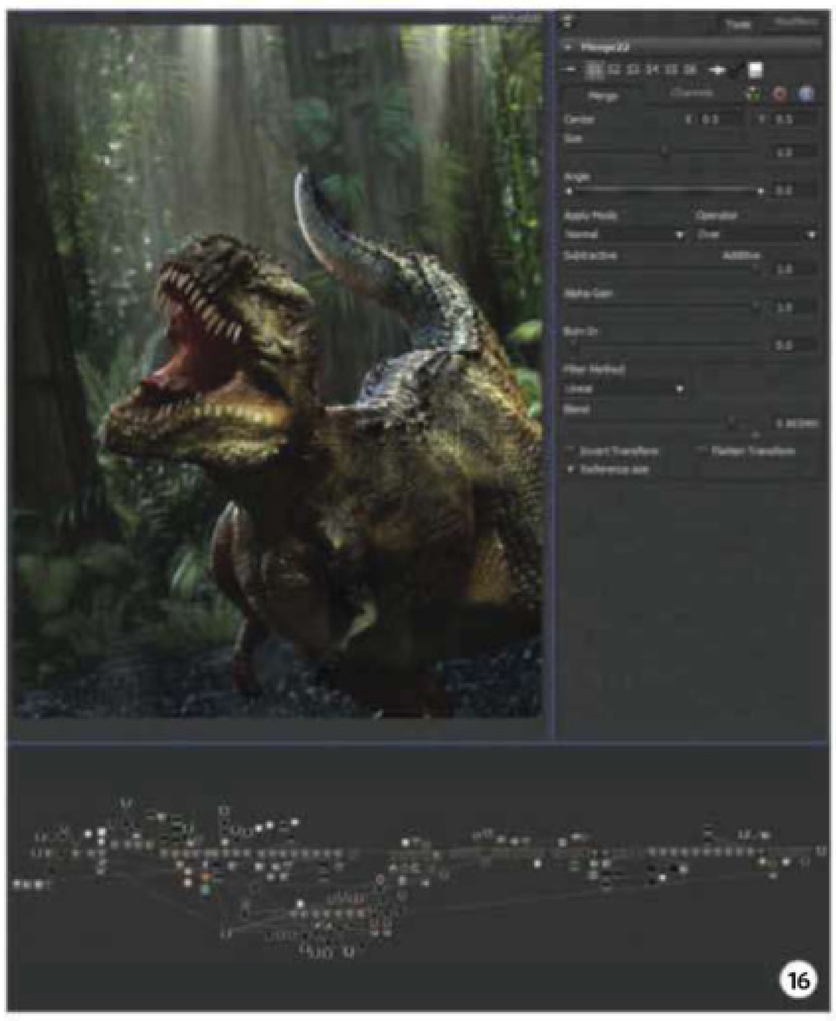
Composite your layers

Combine your various layers using Fusion

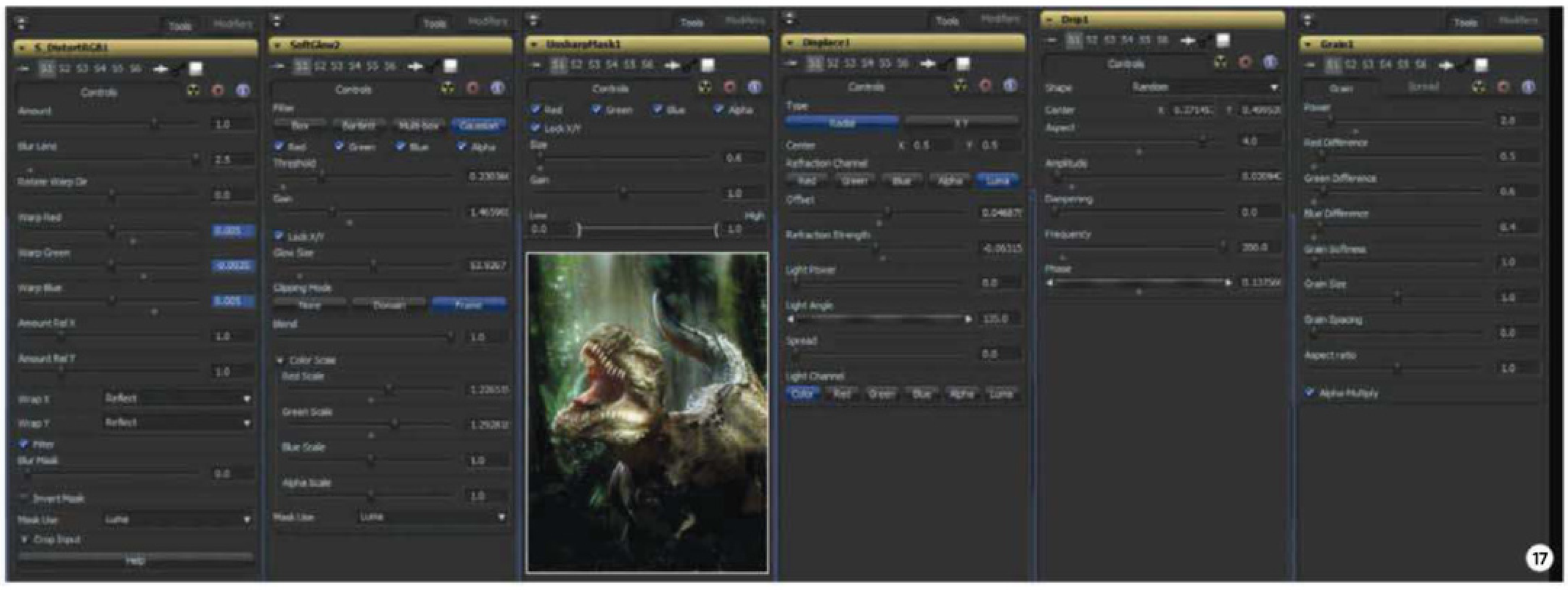
15 Add passes Inside eyeon's Fusion create a background layer and, using the Merge tool, add the rendered environment background layer. We rendered our dinosaur passes separately from the background so we could better blur the environment. Use the Defocus tool with Lens Filter and change the Bloom level to 0.057. There is not a great deal of depth in the composition, which is why we are not using ZDepth to blur the background. The focus will only vary slightly over the creature, while the background is all out of focus. Next let's composite the passes of the dinosaur. First add the beauty pass, then the shadow pass on Normal with a Blend of 0.4. Now add the SSS passes of the skin – we have both Specular and SSS information in this pass, so put them on screen with a Blend of 0.3-0.5. If you need to you can take out some of the speculars or parts of the hands with masks, as they were also thin tissues and might also have a reddish tint from the SSS. Use the Boolean Channel tool to enable extra channels, enabling you to plug the foreground Z-Buffer from the beauty pass to the Boolean Channel tool Z-Buffer (ZDepth info is included in the IFF files we rendered). Add Defocus and Depth Blur to the dinosaur so the focal point will be the eye on its head, while the tail at the end will be slightly blurred. Add another Merge on the background to place the creature over it.

16 Add more passes Use the Merge Node on Multiply to compose the ambient occlusion pass over the other passes. As the background is out of focus, you can mask only the dinosaur. Next is the rays pass. Put it on Normal with maximum Opacity. For the specular pass, put it on screen and it will add specular to the inside of the mouth, around the head, and on the rest of the body. For the fog pass, use a small Blend of 0.18 to separate the back from the foreground and colourise it to make it a green, desaturated colour. Add the teeth pass on top. They used an SSS shader, so it will add some shadows over the teeth. Put them on Normal mode with 0.8 Transparency. Add the spit/spills pass and use Screen mode with 0.5 Transparency. Finally, place some particles on the screen for extra effect. You can do this using a simple dot emitter in Fusion with some blur added to them.





17 Colour grading Your image will likely still look a little uneven from top to bottom. In general the top needs to be brighter than the ground, so use a soft glow with simple polygons to brighten the top part of the background. You can also increase the midtones of the Green channel to add a more lush and vivid feel to the greenery. Sapphire filters can help you for the final touches: add S_distortRGB to distort the three channels around the edges a little. Next use the Unsharpmask tool with a value of 0.6 to sharpen the image. As the creature is roaring and the mouth is wide open it will be good to try to picture the effect of the roar somehow. You can use the Displace Filter and Drip Filter tool with a simple polygon mask around the mouth, which will create a smear effect to create the sensation of a roar. Finally, add some grain to the picture with a Power of 2 and small Red/Green/Blue differences of 0.5. The overall rendering time of the beauty pass was 40 minutes. The individual render passes varied between two minutes and ten minutes per pass.



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Stunning dress design in Marvelous Designer

Lady in Red 2013

> Use Marvelous Designer to create beautiful images of flowing fabric

Sander Boerefijn is a 3D artist with a background in mechanical engineering

Step by step

Easy-to-follow guides take you from concept to the final render

Artist info

Sander Boerefijn

3DArtistonline

Username: SanderB

Personal portfolio site
www.3dvance.nl

Location The Netherlands

Software used Marvelous Designer, 3ds Max, Adobe Photoshop

Expertise 3D generalist, architectural visualisation

In this tutorial we are going to create a dynamic dress design with the software program Marvelous Designer (MD). Marvelous Designer is primarily focused on cloth simulation and is mostly used for the creation of clothing and furniture pieces. It has even been adopted by studios as prominent as Weta, for use on the production of *The Hobbit*.

Throughout each step of the dress creation in this tutorial I will cover the basic functionality of MD right through to some of the more in-depth aspects. We will discuss everything from creating the patterns and the sewing and draping of the fabric to the physical properties and animations. At the end of the tutorial I will also reveal the scene setup in 3ds Max for the final render. The great thing about MD is that you don't need a fashion design background to follow this tutorial or to create any kind of clothing. There's a lot of creative fun to the process! Be sure to check the disc for some accompanying video files that will go into more detail on several of the steps discussed.

Concept

I wanted to create a beautiful, dynamic and flowing dress – one that almost seems to have a life of its own. The image was inspired by a variety of fashion photography.

With the Disc

Tutorial files:

- Marvelous Designer .zpac file
- Tutorial videos
- Tutorial screenshots

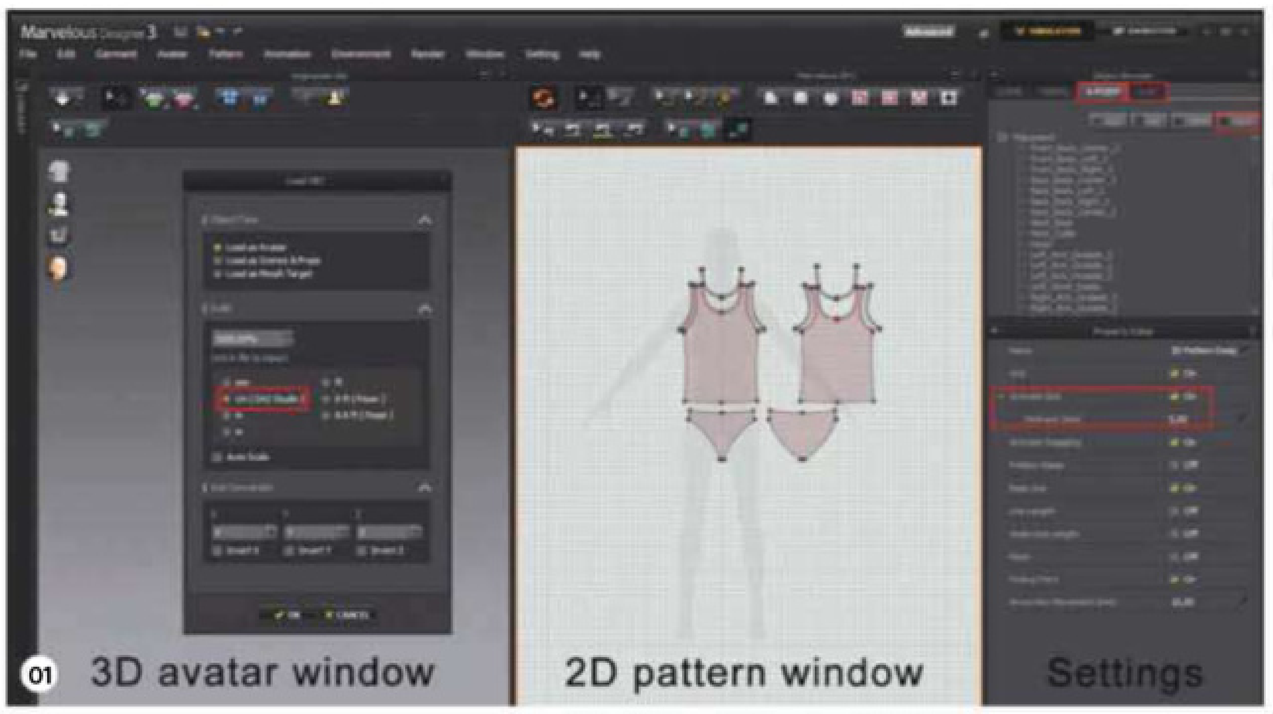
Learn how to

- ☑ Get started with Marvelous Designer
- ☑ Create a detailed dress design in Marvelous Designer
- ☑ Add life to your designs
- ☑ Create a photorealistic render of your design

Avatars and patterns

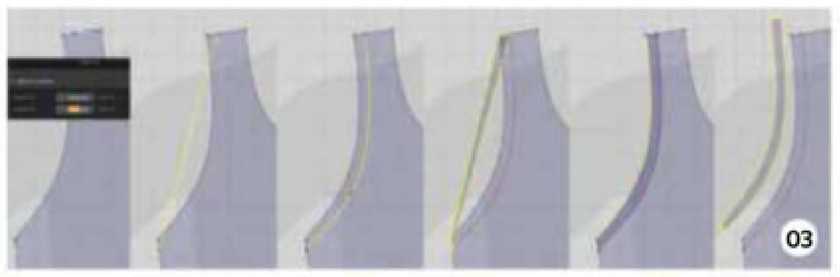
The basics of using Marvelous Designer

01 Explaining avatars In real life fashion design, designers use a mannequin or dress form to drape and size their designs. In MD this mannequin is named an Avatar, which can be seen in the left 3D window. You can pose this avatar in MD using X-ray joints, but for this tutorial we are going to use a custom avatar. We need an avatar in both a T-pose and a final pose, both of which we will both import as an .obj. We want to start with a T-pose avatar so it is easier to drape the initial clothes before animating. However, before we import it we want to make a backup of the bounding volumes (A-BV) and arrangement points (A-POINT) of the default avatar. This way we can reuse them with our imported avatar later on.



02 The pattern window Before we start making the 2D patterns for the undergarment we want to enable the grid and then set the grid distance by going to the pattern window properties (F12). This and the unfold option will help us when making symmetrical patterns such as this dress. Start with the freehand polygon tool and create only a half of one side of the pattern. Use the background shape of the avatar to get an approximate idea of the correct size. Now right-click on the edge over which you want to unfold and then copy and paste the result to create the backside. Using this workflow you can adjust the pattern relatively quickly until you are satisfied.

03 Add hems Next we will add some hems to the top and sides of the dress. With the Add Point/Split Line tool, right-click on the edges on the sides of the hem. Now you can fill in a distance to create a point on both sides. Disable the grid for now so you can use the Internal Line tool to connect these two points. Edit the curvature of this line to match the outer line. Make a new polygon out of the four points and adjust the curvature to match it with the others so that we have a piece with the same shape.

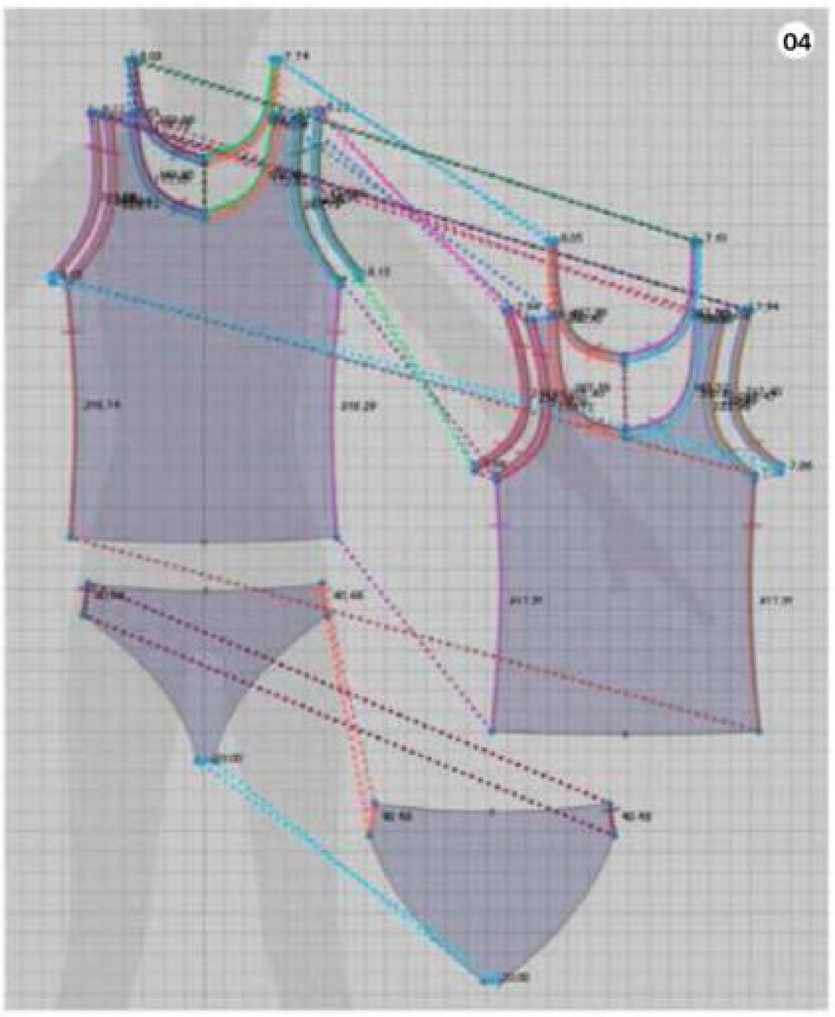


Using the Marvelous Designer avatar

I used the avatar that ships with MD, adjusting it and posing in 3ds Max, before exporting back into MD. To get this avatar or the catwalk animation that comes with it into your 3D package you need to open the .avt file that is located in the Marvelous Designer install directory (C:\Program Files\MD 3 Personal\Model\Avatar\AVT). You can open this file using an unpacking software like Winrar or Winzip and in it you can find the Collada (.dae) file and the textures.

Pattern sewing, draping and adjusting

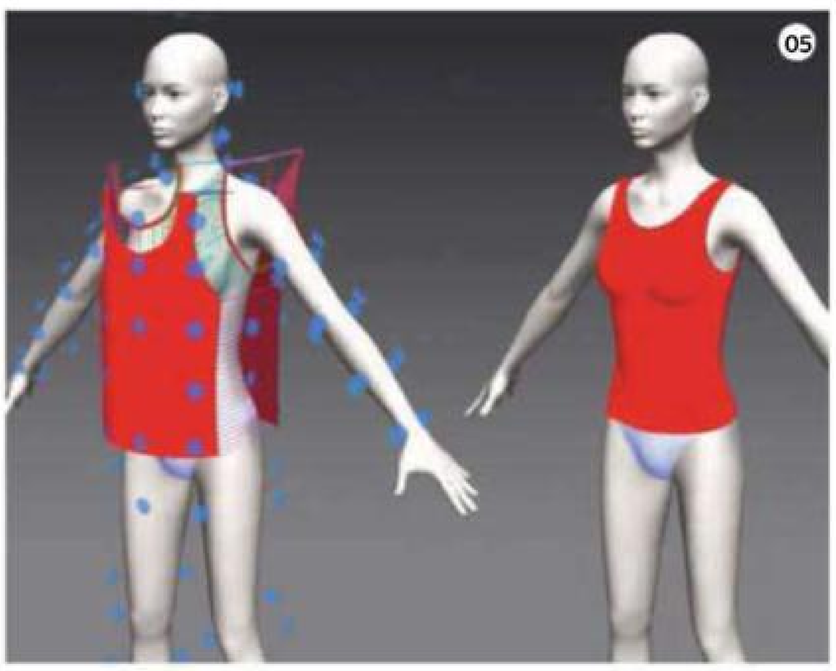
Time to start working in 3D

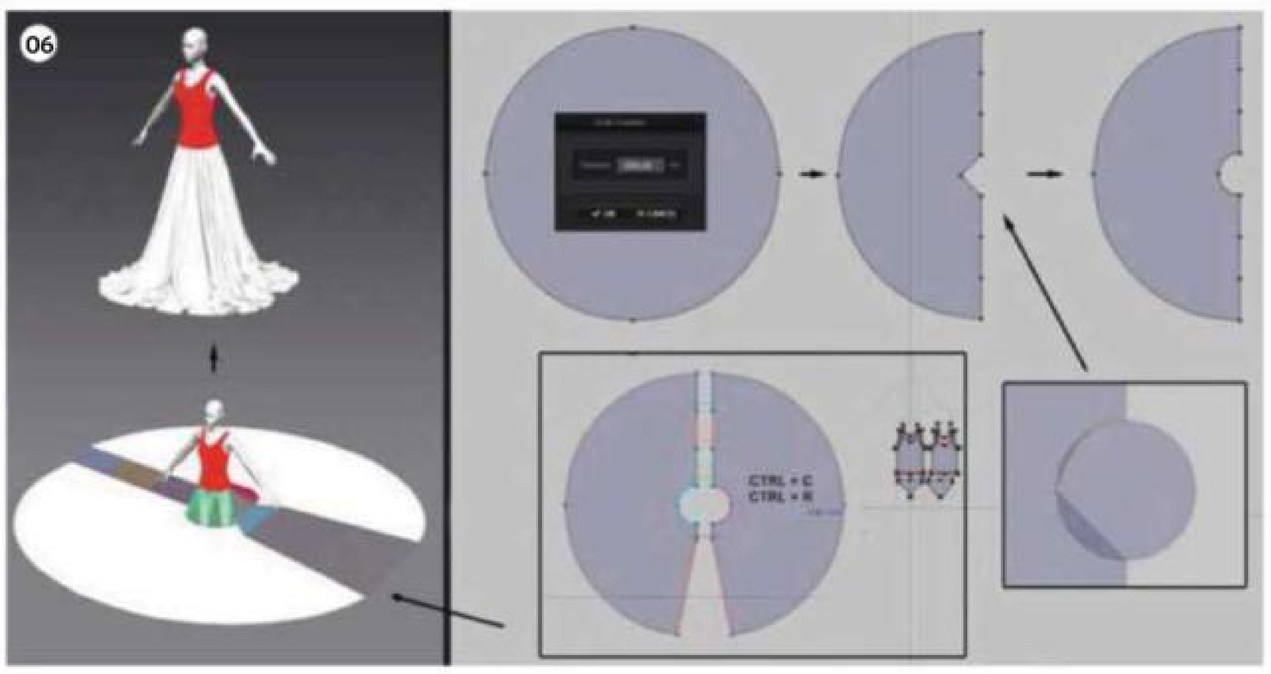


04 Sew the undergarment Before we can drape the garment we must first use the sewing tools to connect all the pieces together, as you can see in the image. Ensure that the crossed line is always on the same side of the sewing line on both pieces. If the seam is reversed you can fix it by right-clicking on the sewing line with the Edit Seam Line tool and pick Reverse. Sometimes it's hard to see if the seam is correct but the 3D window will help.

05 Drape, simulate and adjust in real time When we press the sync button the patterns will appear in the 3D window but need to be set in place. For this we are going to load the bounding volumes and arrangement points we saved earlier. Now we can select a pattern piece and click on the arrangement point where it should be placed. Once the pieces are in place and all seams are correct it's time to start simulating. Once the clothing has settled we can identify if there are some places that need to be fixed by either changing the 2D patterns or by dragging the clothing around in the 3D window in real time. Another helpful tool here is to use the Strain Map mode, which indicates which parts of the clothing are too tight or too loose according to colour.

06 Start on the bottom half Start by creating a polygon circle by left-clicking in the 2D pattern window. Fill in a radius of 3500.00mm and delete the right half so a semicircle remains. Split the straight line into seven uniform lines and split the resulting middle line again in two uniform lines. Grab the point last created and hold Shift to drag it to the left. While holding down the Shift and left button, click on the right button to get a popup to enter a value. Fill in the amount of half the length of the seven lines' length. Now create a new circle using the line length and place it right in the middle of the three middle points. Now we can use this circle to trace around and then delete it. On one of the outer sides we want to leave out a part of this pattern so the edge of this layer will try to curl a little. Copy, mirror and then paste this part to create a full circle again. Sew it together, and then onto the lower edge of the undershirt. Simulate it falling into place.





Particle Distance

It's a bit of an odd term for what it defines, but the Particle Distance value determines how dense your mesh will be. This value is the average distance between vertices in millimetres. So a lower Particle Distance will increase the amount of vertices and with it the detail. Be careful that you don't go too low. Set the Particle Distance to your desired mesh complexity.

07 Wrap the top section Before we wrap the top part of the dress, we want to create two internal lines in the undershirt to attach the draping layers and the drapes of fabric. Freeze what we have created so it won't interfere. Create a rectangular pattern piece and sew it to the line we just created on one end. In the settings for the piece set the layer property to a value higher than the underskirt so it will fall on top of it. Now we can use pins, created by holding W down in the 3D window while clicking, to pin the long part into place. We need to move the pins around to make new pins while wrapping the piece around the body. At the end remove all pins, except maybe a few important ones, and simulate it into place. You might need to drag the pattern piece around to get it placed as you wish. Lower the Particle Distance to give it some more detail.

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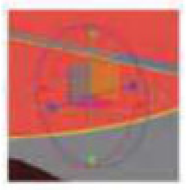
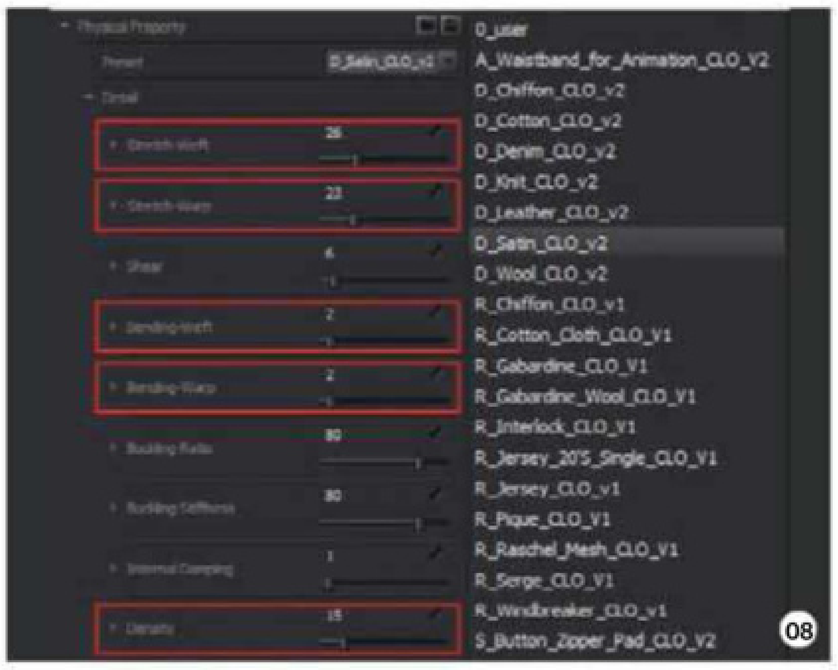
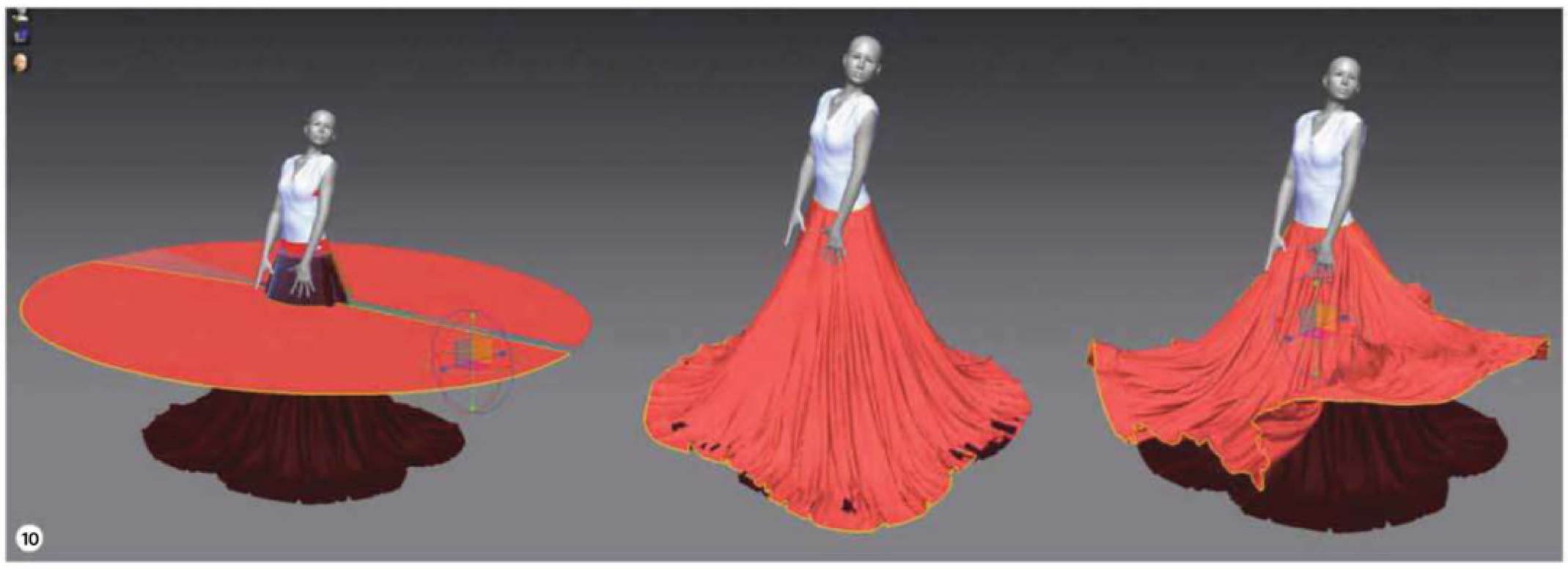


Material and physical properties

Animate the dress layers and physical properties of the materials

08 Material physical properties When we've simulated the pieces up to this stage, they have all reacted in a manner dictated by a set of physical material properties. The undershirt will have stretched out when the draping part was pulling it down, for example. You can change these settings to simulate different kinds of cloth materials, using MD's useful list of presets. These presets provide a helpful starting point for changing material physical properties. For the undershirt we will apply a simple cotton preset as we won't see a great deal of this garment in the final render. However, for the more visible parts of the dress we will use the satin preset. Lower the values of both the Bending-Weft and Warp to 2 so they will bend a lot easier. Also lower the Density so the fabric will be lighter when simulating. Change Stretch-Weft to 26 and Stretch-Warp to 23.

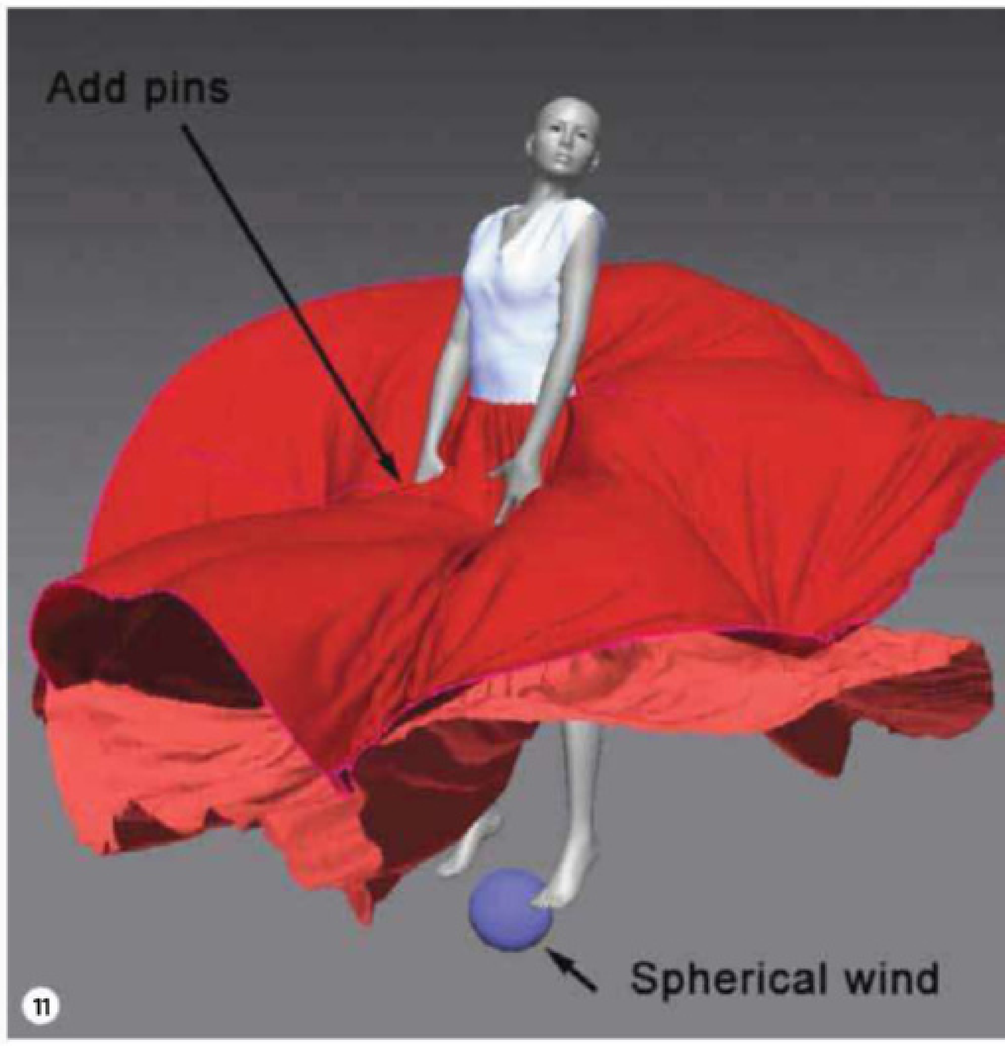




09 Animate layer one Now that we have set the physical properties we can start animating the draping layers using the Wind option. Activate this from the Environment dropdown. Select the Wind icon and in the properties set the Strength to a slightly lower amount and enable a Frequency that causes the wind to start and stop over set periods of time. Set the wind to Spherical and place it just underneath the avatar's feet, causing it to blow the dress upwards. Click the Simulate button and see if you are happy with the result. If not, tweak the settings. You can also use the mouse to drag the dress in the direction you want it to go. Once you are satisfied with the way it looks, stop the simulation. At this point we want to disable the wind again and start increasing the Particle Distance of the dress to create more detail.

10 Start on the other draping layers Once the first layer is done save the file and export what you have to .obj. Create a new avatar that includes the first draping layer. This way it doesn't need to simulate the first layer again and our second layer won't go beneath it when we simulate it. We can create the next layer quite simply by using the pattern of the first layer once we have imported the new avatar. This routine will be duplicated for the third layer once the second layer is completed.

11 Animate the second layer For the next layer we will follow a similar routine as we did when animating as the first. However, we need to raise the wind settings so the upper layers will float higher. We also need to add pins to the end of the fingers to prevent the next layers from going through the hands. This part of the creation process can require some tweaking of settings and pulling of cloth to achieve the desired result. If you're using the advanced version of MD you can just let it simulate and then afterwards select the specific frame you like best. Lower the Particle Distance to make the simulation go slower and create more detail.



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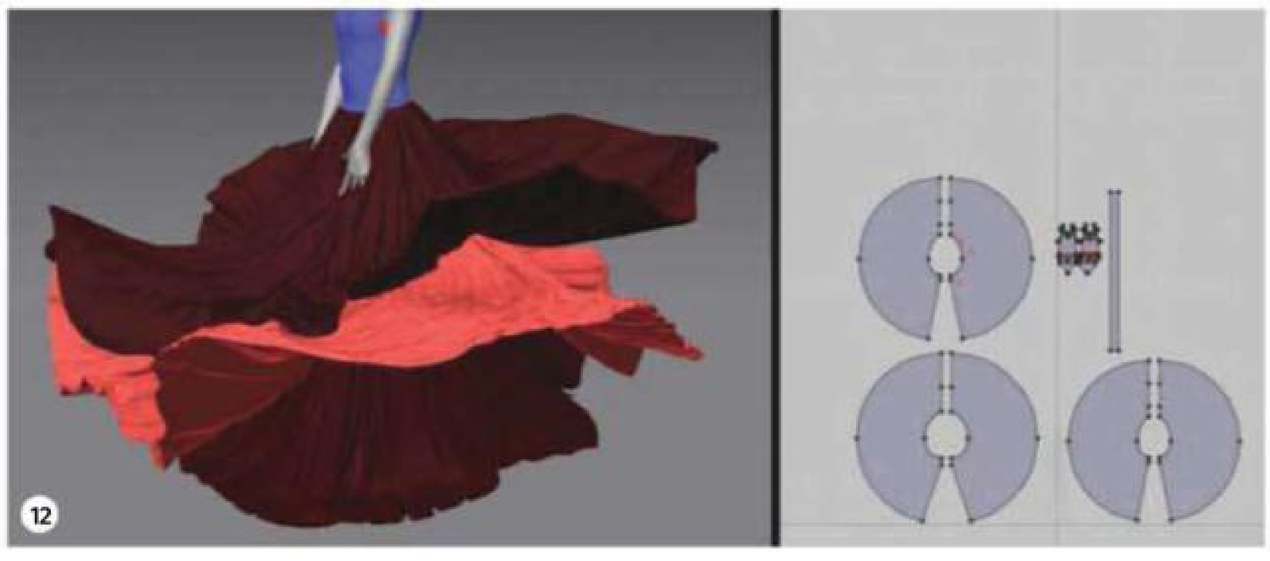
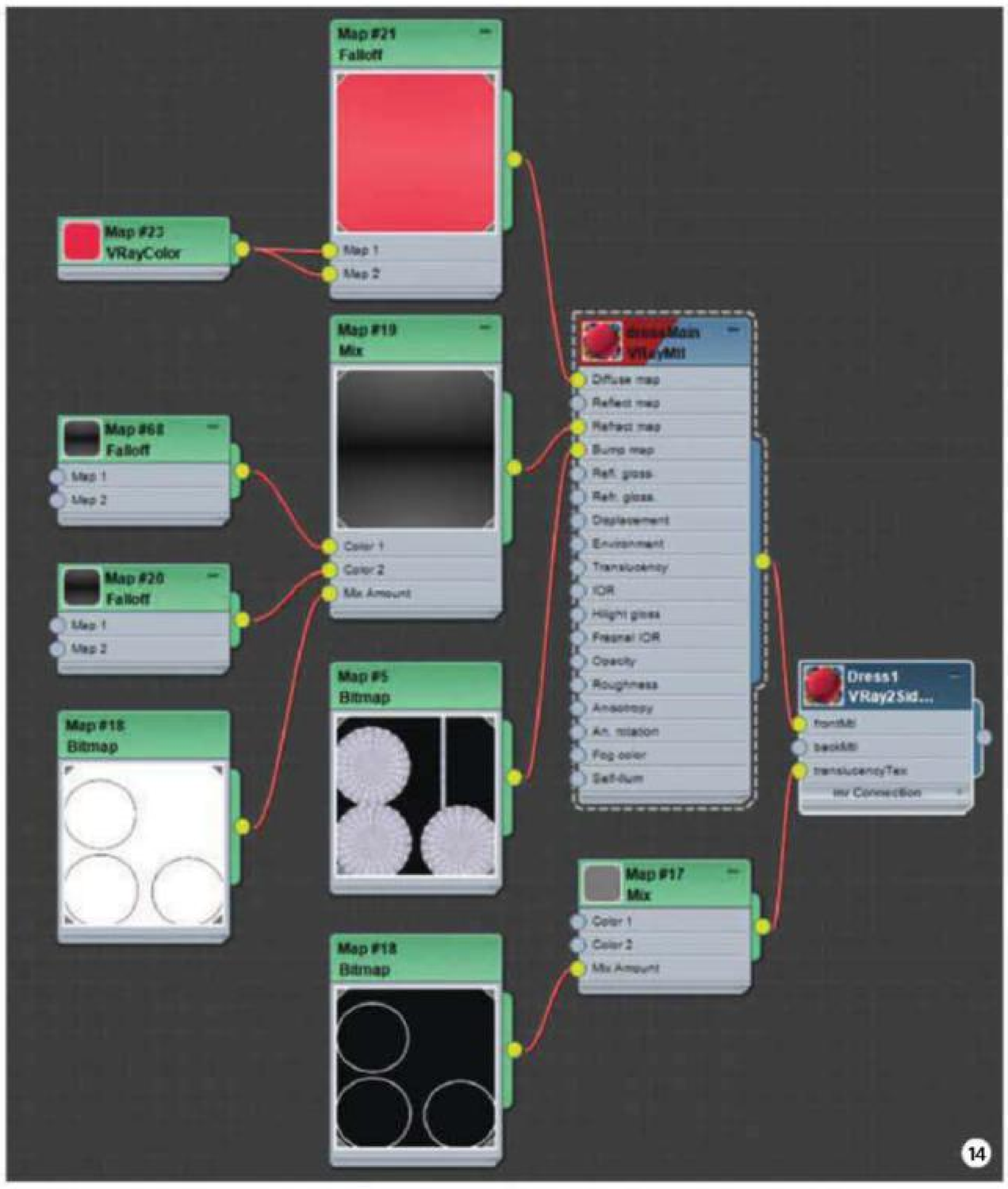
Finalising and rendering

Finish the dress in MD and render using a V-Ray



12 Finalise the dress Once you are finished animating a third and final layer, you will need to complete the top part of the dress. In the avatar properties set the Skin Offset to 1 and make sure the wrap part is on a higher layer value than the third draping layer. Simulate the wrap part so it will fall over the third layer. Next, add the other layers and switch the avatar to the first posed one.

13 Export to 3ds Max To export the dress we need to order the 2D patterns nicely in a squared shape, because it's from this that we will generate the UVs. In the export .obj options use unified UV coordinates to export the cleanly laid out UVs. Use the same scale as you will use in 3ds Max. In my case I am using cm. After importing the dress into 3ds Max, add ProOptimizer modifiers to the separate parts to lower the vertex count if needed.



14 Set up the V-Ray material By adding an unwrap UVW modifier and extracting a UV template from the dress we can create an Opacity map and a Bump map. The Bump map is used to create some additional wrinkles and in my case was created from textures of crumpled paper. The Opacity map adds the illusion of thickness to the material edges. These maps were then used in a VRay2sidedMtl, which gives the dress a very thin, see-through feeling. The falloff map is a map I use a lot in my cloth materials. Most of the time I will turn off the trace reflection option. The skin material is a VRayFastSSS2 and the hair material is a VRayHairMtl.

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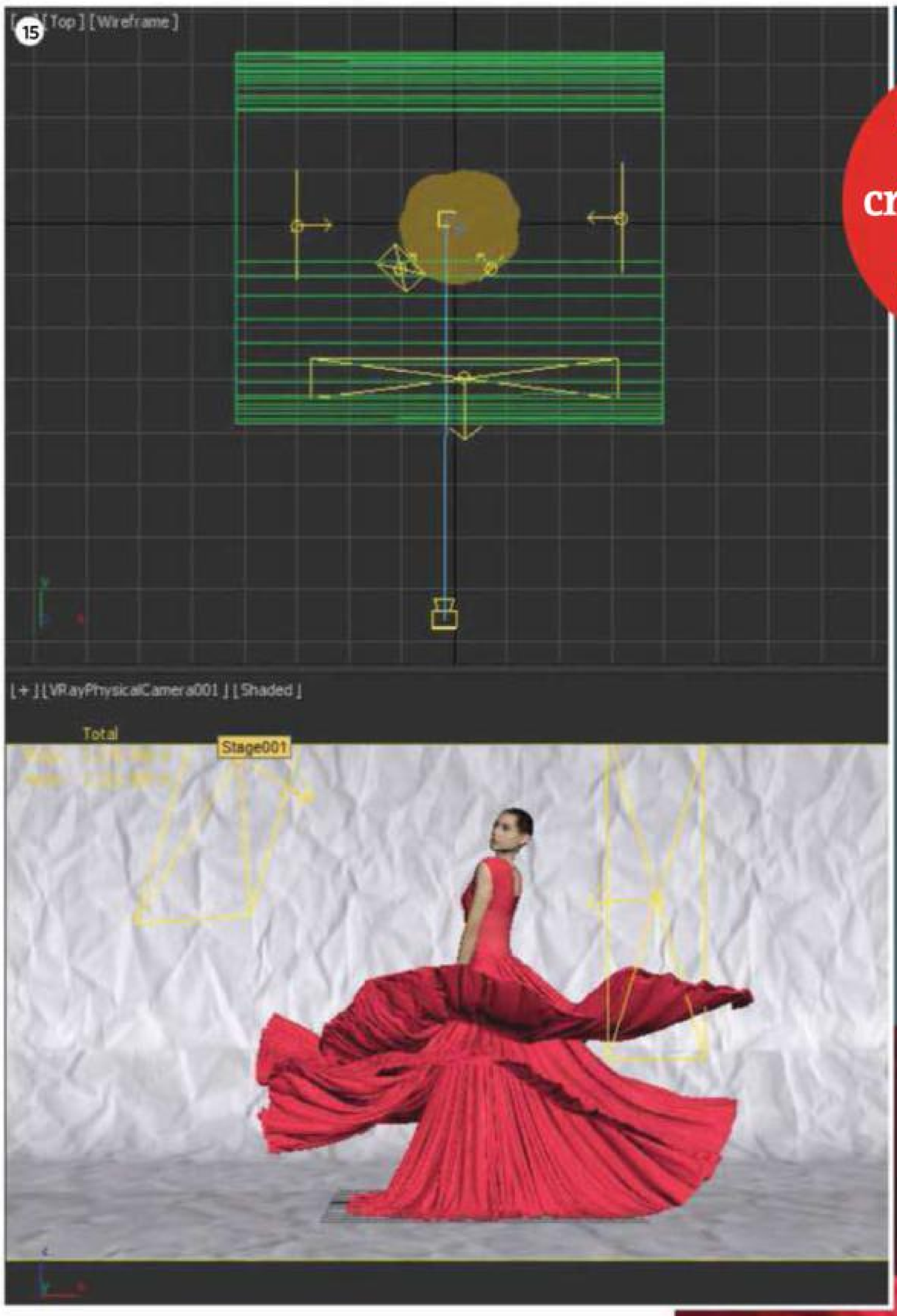

Importing personal patterns

For this image I created the clothing patterns myself, but you can also use some patterns from external sources should you wish to. Since MD doesn't have an import function for pattern files a little workaround is needed. First convert your pattern source to a supported image file. Create a new material and apply the image to the texture slot. Next, create a rectangular pattern piece and apply the material. Now you can make the new pattern pieces by tracing over the image with the Create Polygon tool. Don't forget to freeze or delete the pattern piece with your image on it afterwards.

15 Scene and render setup For this scene I used a studio setup ,with a key light with a slight blue tone and a VRaySoftbox texture in it, shining in the direction of the avatar's face. I added a main fill light from the opposite direction and three fill lights on the sides with colours varying between a light blue and light yellow tone. In the environment slot I used a 360-degree spherical image of a warehouse that creates realistic reflections to add to the depth of the piece. The avatar's hair was achieved using the Ornatrix hair plug-in from Ephere with the VRayOrnatrixMod modifier on top of it.

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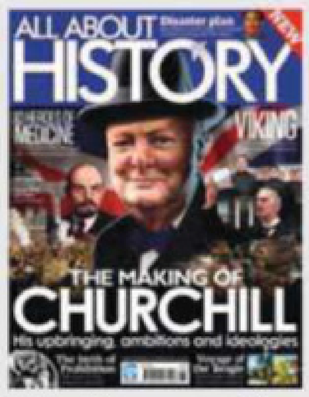

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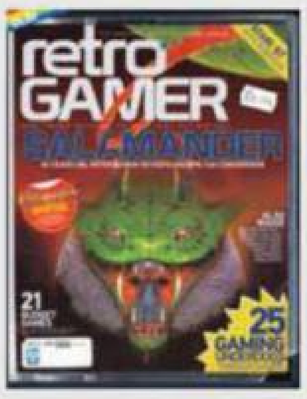

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The audience's attention is typically centred on the character's face, especially during a shot with dialogue

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Tutorial files:
- Dialogue_Shot_Start.ma
- Dialogue_Shot_Final.ma
- Dialogue_Animation.mp4
- Dialogue.wav

Animate a Maya dialogue shot

"Digital-Tutors reveals how to create seamless and believable Maya dialogue shots in 12 easy steps"

Tackling a shot that involves facial animation can be a challenging process that takes a great deal of time. In fact, so much work is involved that it's best to approach the facial animation as if it's a completely separate shot in and of itself. There is as much planning and care involved in animating the face as there is in the rest of the animation.

In this article, we will condense the process into 12 important steps, ensuring the facial animation of your shot is rock-solid and can hold up on its own.

When animating the face, head and mouth, the same techniques that you use to animate the entire body can be applied. Timing, lead and follow, drag and exaggeration are all extremely vital to accomplishing a great animation. Any time the audience notices something strange in the animation, that's the moment they will stop buying into your character. That's the last thing that you want to happen.

Since you're trying to convey real-world movements into a 3D virtual world, knowing how human faces move is an extremely important step. With this in mind, before you even start attempting to create believable, well-crafted facial animation, you need to carefully study how your own face deforms and moves around. Try looking in the mirror and reciting the dialogue yourself. What do you see? The amount of planning that is involved can seem like overkill, but having this type of preparation in place will speed up the process and help push the animation to the next level. As ever when working in 3D, taking the time to get things right is key.

The character that we are going to animate will be saying: "Ahhhhh... Have you seen the rest of my body?" The shot is 77 frames long. Our example character is an ogre, but any character rig with good facial controls should suffice. You can find the tutorial project files free with the issue.

Animation tutorials

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Important tips for creating your dialogue shots

01 Create a dialogue chart

As we mentioned earlier, planning is incredibly important when working on a shot with dialogue. Write down each word of dialogue and then break it up into syllables. Next, track the timing for each word and study where the emphasis hits, or the points where the character speaks most loudly in the audio. Most words should have one of these emphasised sounds. Take notes on what syllable they occur on, and then use the information as a guide as to where to push the lip sync in your animation.

02 Act out the scene

Animators are actors. The best way to get ideas for the scene is to get in front of a camera and act out the shot. Don't be shy or feel awkward – all animators do it. Try to become the character during the acting process. Play the audio in the background and play out the scene over and over again. When you think that you have got the shot, play back the video that you've captured to double-check. Only stop when you are entirely happy with your performance. A good rule of thumb for this is to force yourself not to settle for anything less than 15 to 20 minutes in front of the camera. This technique will help you to really get into the acting of the shot, and give you plenty of different options to pick between.

03 Block in six key poses

Use the video that you shot in order to find the proper storytelling poses that truly describe the facial animation. For each storytelling pose you should make sure to pose each area of the face, rather than just the entire head. This technique will help you to work out the type of facial pose that you want to hit for each specific word in the dialogue. Try to keep the poses to an absolute minimum; you only want to block in the most important ones in at this stage. For example, our blocking pass consisted of just six main poses.

04 Create breakdowns

The breakdowns are the poses in-between the storytelling poses that describe how the character is getting from one pose to the other. Study your reference and use that as a guide to help you create your breakdowns. Look at the spacing between each pose that's in your reference and incorporate that into your animation. It's very important for you to remember that breakdowns are not just in-betweens. You should be thinking about drag, exaggeration and poses, all of which can add a more appealing look to the action.

05 Exaggerate the movements

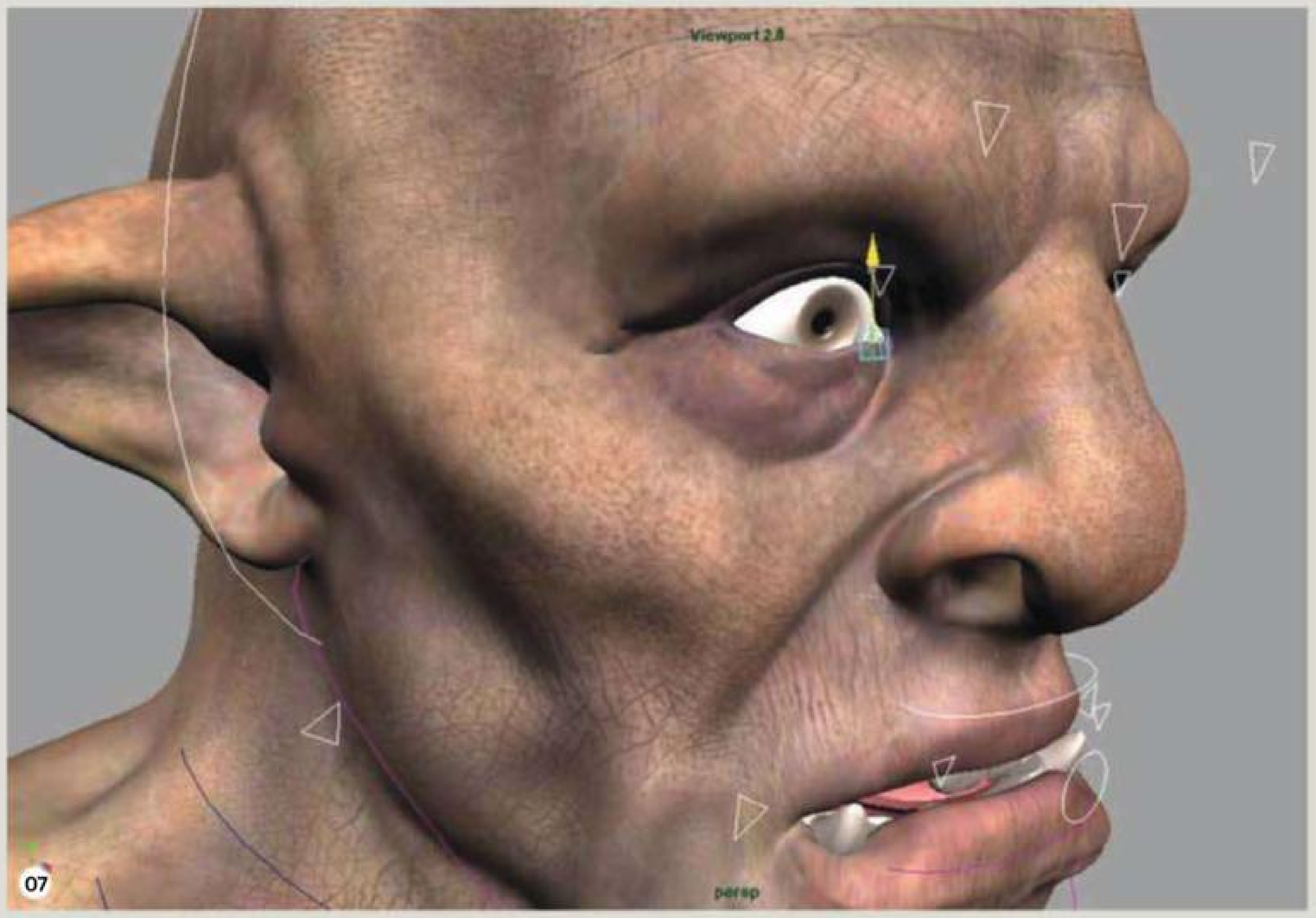
Once you have all the proper breakdowns in place, the brunt work of the animation is almost done! Make sure the timing is exactly how you planned it and your holds are in the right spot. Once you're happy with the timing, go in and start pushing some of the poses to really exaggerate the facial movement. For example, when the character brings his head down, drag the eyebrows and have them offset a few frames. You could even play with the scale attributes for the head to add some squash and stretch. Exaggerating movement is just as important with facial animation as it is in the rest of the body.

06 Animate the eyebrows

It's important to have strong eyebrow poses to sell the facial animation. Don't overdo it by having the eyebrows moving during every single word. Instead, find a few important eyebrow shapes that you want to hit during the dialogue. In the ogre animation there are really only two main eyebrow poses: frowned and surprised. It's how you transition between the two that helps sell the animation.

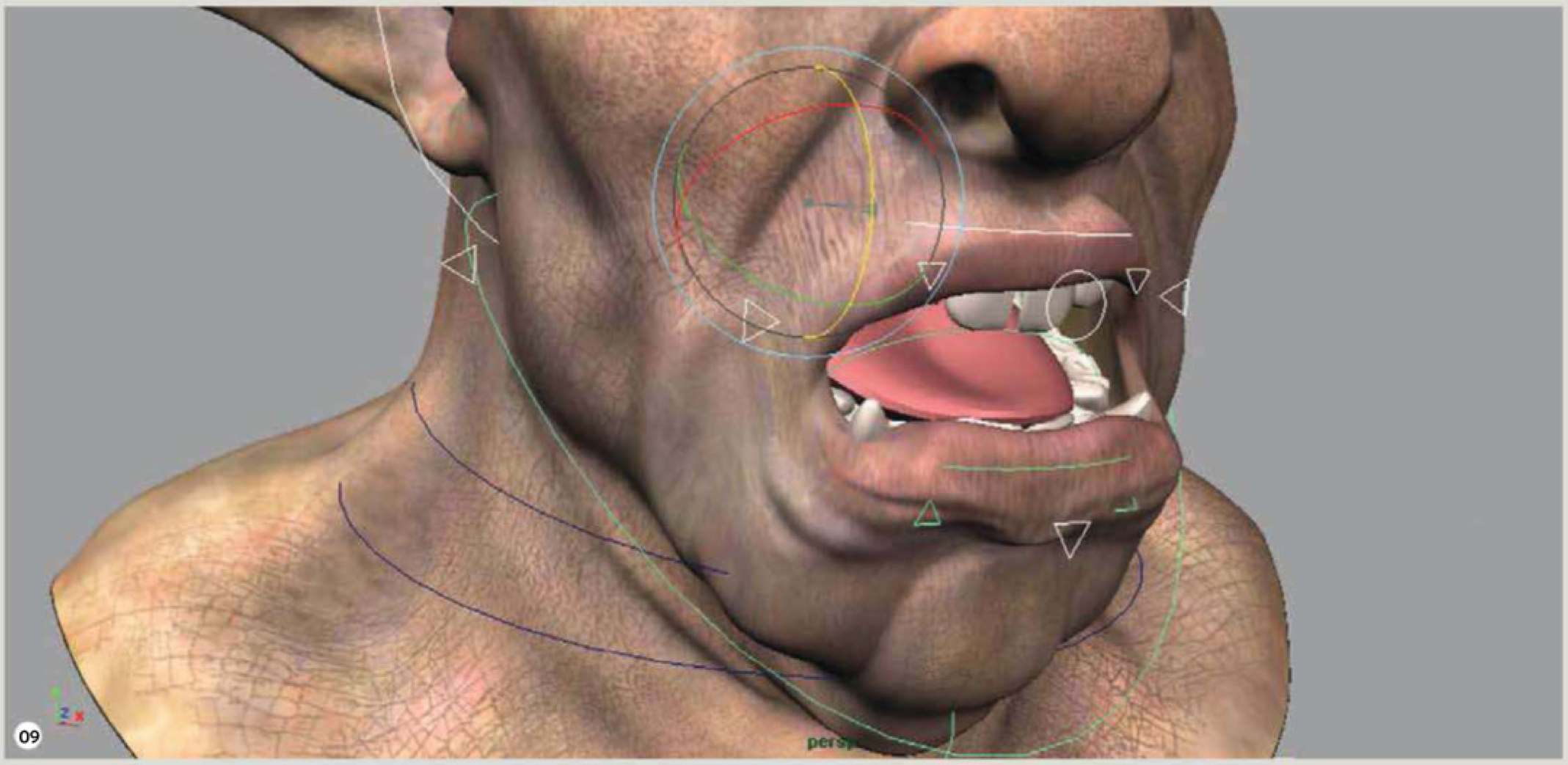
07 Fine-tune the eyelids

After the overall movements of the head are looking how you want them, it's time to go in and start fine-tuning some of the smaller details. The eyelids may seem like the least important area on your character, but they can really help sell the emotion of your character if used right. For example, in our animation the eyelids have been opened very wide in the spots where the eyebrows are raised. This makes our character's face feel like it's all one cohesive unit, working in sync.



08 Add in blinks

When adding blinks to your facial animation, make sure that you aren't adding them just because you think the character's eyes must be getting dry. If you want to add in blinks with the correct timing you need to think about the emotional state of the character. Is he angry? Sad? In our animation, the dialogue has a concerned tone to it, so the character's blinks can be minimal. In this shot there are a total of three blinks; the first is during the head turn at the beginning, the next is when the character looks up at camera, and the final one is when he bobs his head. Remember that you can also use the controls under the eyelids to be able to really make each blink feel fleshy and tactile.



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09 Time for lip sync

Once the head movement and face are working properly, it's then time to work on the lip sync. This should be relatively simple because you created the dialogue chart in step one. The first thing we need to do is block in the jaw opening and closing. Typically this is done at the start and end of a word, however, it can be very easy to fall into the trap of opening and closing the jaw far more than is actually needed. Keep referring back to your reference video to see how much the jaw moves while the dialogue is being delivered and don't overdo it. Once this is completed you're already halfway done with the lip sync.

10 Work on mouth shapes

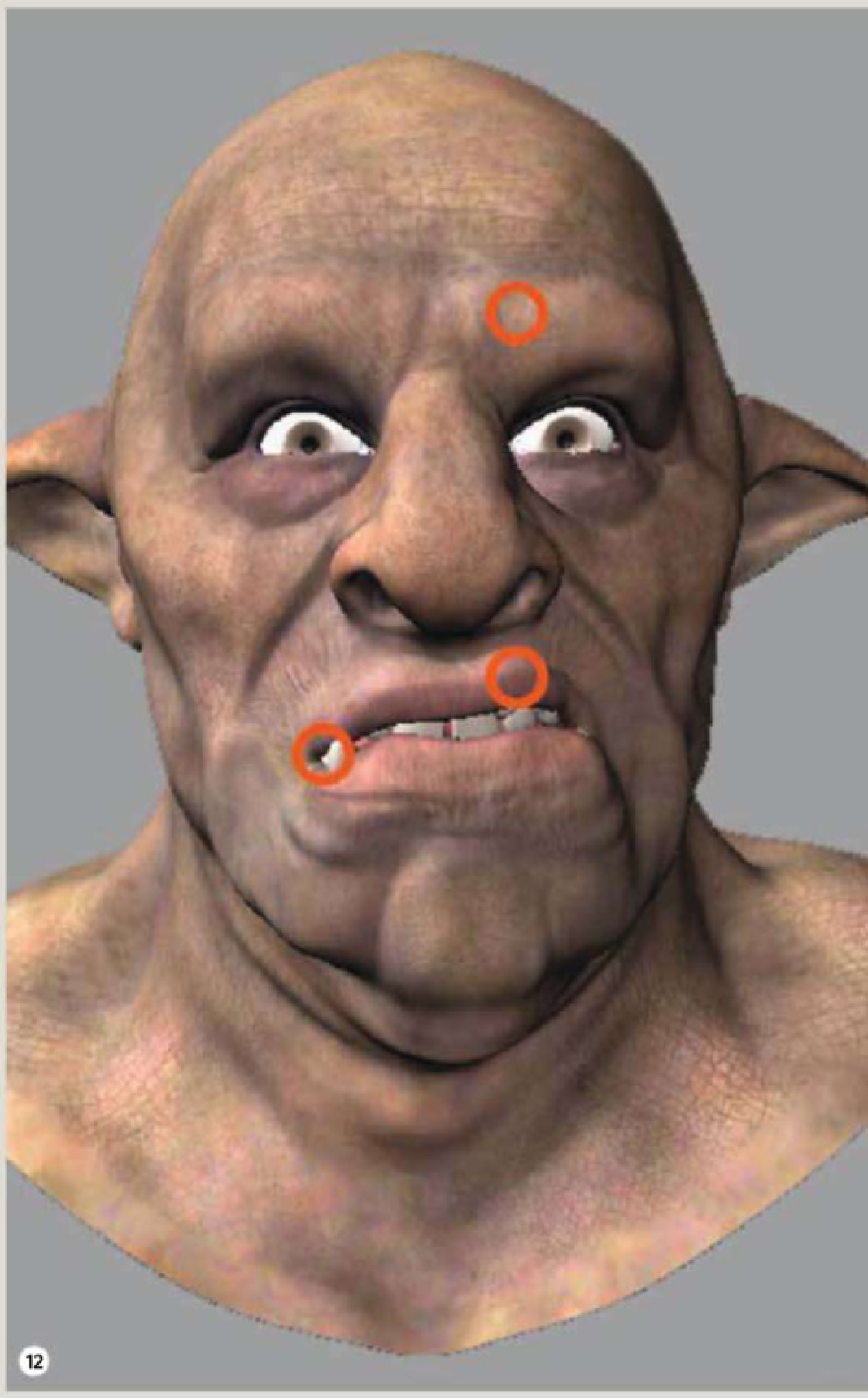
When you have blocked in the jaw movement, you are then able to go in and start fine-tuning the shape of the mouth. Add some asymmetry to the mouth shapes to help add believability. Animate each lip control to get a sort of peeling effect when the mouth opens. Think about the arcs that the jaw is taking during this stage. You can really add a very fleshy look to the lip sync by animating the entire rotation axes as well as the translate axes. Have fun with this and don't be afraid to exaggerate!

11 Animate the cheeks

A great place to make the character's face feel fleshier is in the cheeks. When animating the face you do not want any area to feel dead, so utilise some of the facial controls in order to make the face feel like it's all one unit working together to create the shapes. For example, when the 'B' sound is being expressed in our shot, try using the facial controls to puff out the cheeks. This adds a sense of realism to the shot, while also making the lip sync feel more natural.

12 Polish the animation

Once you have animated the lip sync, it's then time to go in and add that final 10%, which – as you will see – will really push your facial animation to the next level. Simply track the arcs of the corner of the mouth, nose and eyebrows. Tweak the eyelids in order to get a nice fleshy look during blinks. Once the polish pass is finally completed, then your facial animation is finished!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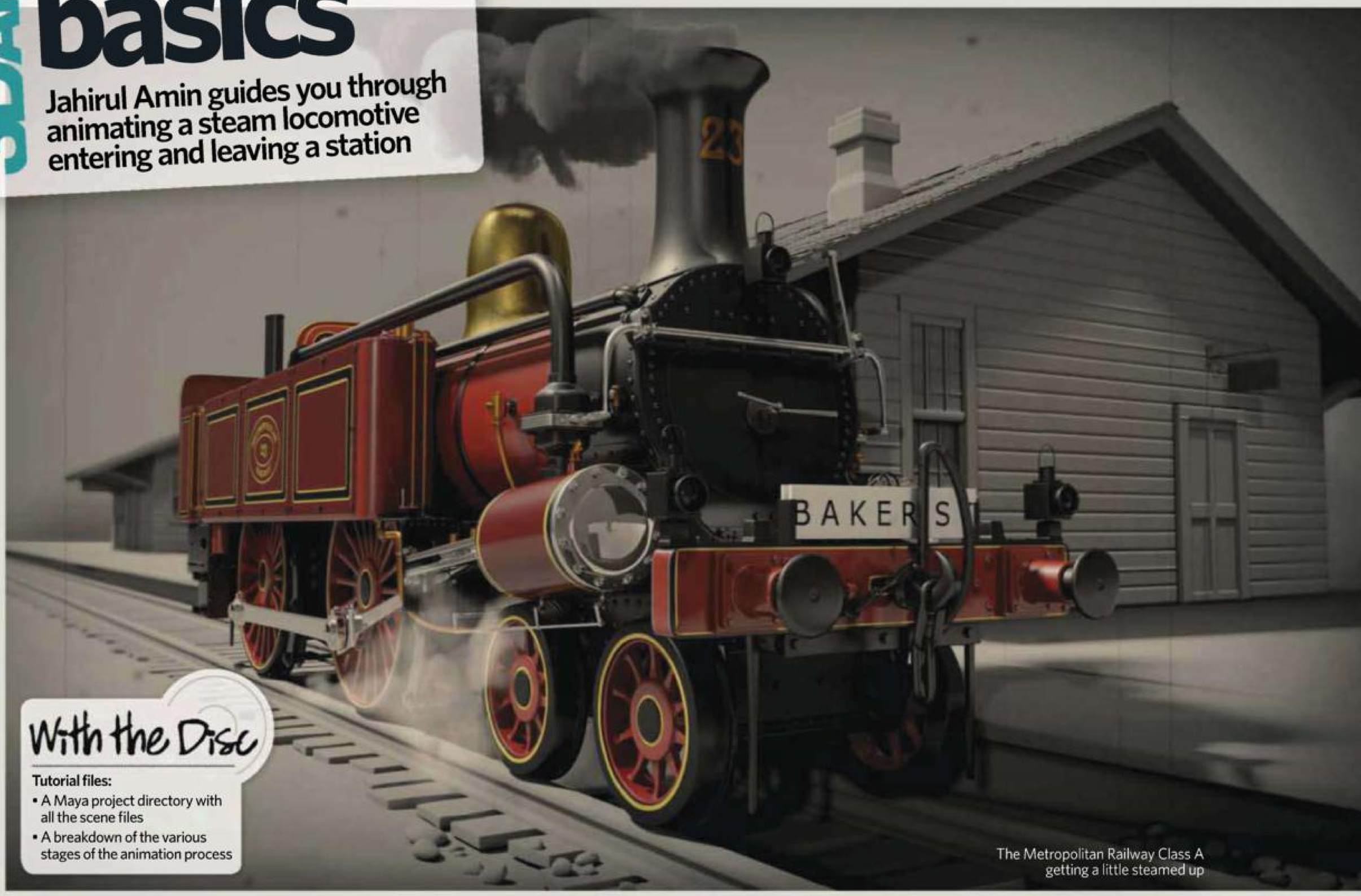
Back to basics

Jahirul Amin guides you through animating a steam locomotive entering and leaving a station



The Metropolitan Railway Class A getting a little steamed up

With the Disc

Tutorial files:

- A Maya project directory with all the scene files
- A breakdown of the various stages of the animation process

Animate a steam locomotive in Maya

"In the final part of this series, we look at animating the Metropolitan Railway Class A"

In parts one and two of this series of tutorials we first modelled then rigged a steam locomotive, Metropolitan Railway Class A. In this final part we will animate the locomotive, but moving it along the track is only half the story; naturally we'll need to create some steam to pour out of the funnel and from underneath the engine. The following tutorial will provide a good exercise in a layered approach to animation, but will also offer some guidance on creating steam/smoke effects using Maya Fluids.

Before we look any closer at the process here, it's worth me mentioning that I've added a small environment since the last tutorial. It is a small station at which the locomotive can stop and then start off from. I decided to go for a slower animation of the vehicle coming to a stop then pulling off, rather than a faster version of it travelling at speed, as the former will better show off and utilise the elements of the rig we created in the previous tutorial.

As with the previous tutorials, conducting thorough research is imperative before attempting anything in CG. Look at locomotive references on the net, bearing in mind, as you do, that the steam engine we have already modelled was light by comparison to the others of its day. Clearly, weight must be kept in mind when animating, so check you're not using the larger models, such as Flying Scotsman, as your reference.

Researching how steam trains were constructed before modelling the Metropolitan Railway Class A for part one of this series gave me a whole new understanding and deep respect for both the vehicles themselves and the men who crafted them. Similarly, watching videos on how steam trains are driven has opened my eyes as to the skill and artistry involved in making these beautiful beasts move down the tracks. It is very apparent that both driver and engine have personality, individuality and idiosyncrasy, and I think one of the challenges of the animator is to let this colour shine through.

A major factor to consider while watching train footage is rhythm. Listen to the rhythm of the 'chuffs' change as the vehicle accelerates and decelerates, and watch too how speed affects the steam produced. Another factor to watch for is the

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steam. You'll quickly notice that the steam/smoke can be white or almost black; wispy or as dense as fog. Choose a look that you like and feels appropriate.

The first part of the tutorial below then, is animating the engine. We will be using a layered approach, so first we will set the key positions of where the locomotive starts, stops and then heads off again. Next, we will add in-between poses as the engine makes the turn in the tracks. Following this, we'll re-time the animation to accelerate and decelerate the locomotive gradually. Finally, we'll add the wheel rotation and the movement of the brakes.

In the second part we'll focus on the steam/smoke that comes out of the funnel and the cylinder cocks on the undercarriage. To create it, we'll use Maya Fluids, but before you make a start with this task there a few points to consider. Firstly, fluids are heavy, so please consider the capabilities of your computer and if necessary, think about using nParticles instead. There are plenty of examples of fluids and nParticles that you can find in the Visor (Windows>General Windows). It's good to go in and try and reverse engineer these scene files to get a better grasp on creating such effects. Getting the desired results with fluids doesn't come too quickly or easily; it takes a lot of patience and tinkering. Also, as we do not have time or space enough in this tutorial to explore what every setting does for the fluids, I recommend that you read through the Maya documents to provide you with a slightly better understanding.

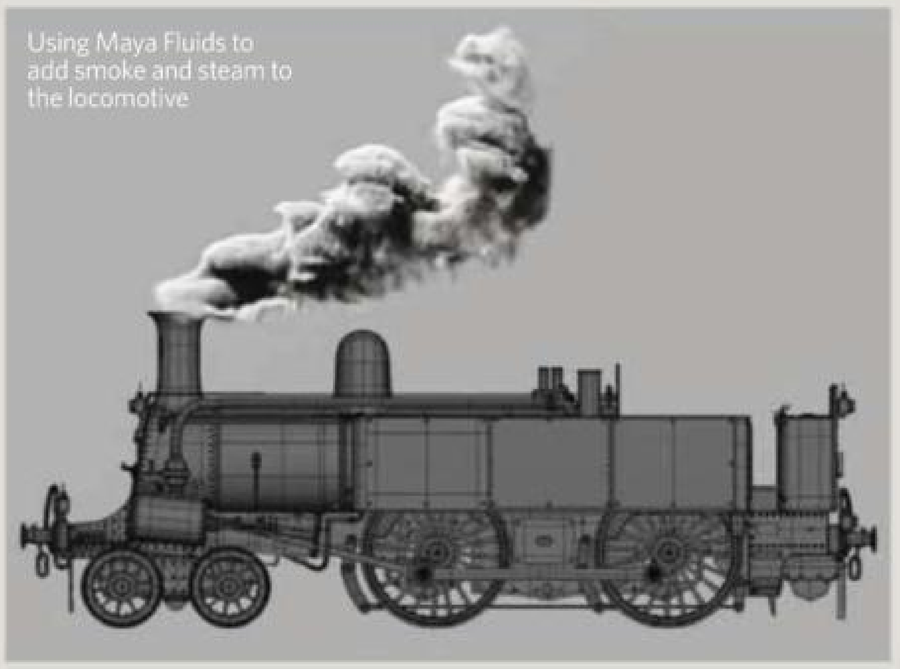
Before you start, make sure to check your Animation Preferences (Window>Settings/Preferences). I will be working in PAL (25fps) and have my Default In and Default Out Tangents set to Auto. Also, make sure that you test out the rig beforehand, have a play with it and get accustomed to how the controls work together before starting the shot. Since the locomotive is a pretty heavy mesh, I've also added some display layers to toggle the geometry on and off as needed. Lastly, I advise playblasting your animations as you progress in order to get a more accurate indication of the timing. Keeping these tips up the sleeve of your trusty train-spotter's anorak should keep you nicely on track.

Another angle of the passing locomotive

Tickets please...

01 Set up the camera

Go to Create>Cameras>Camera and rename it 'renderCam'. Set the camera's Focal Length to 28 and then open up the Render Settings. Scroll down to Image Size in the Common tab and set the Resolution to FullHD 1280. With the camera selected, in the Viewport Menu go to Panels>Look Through Selected and then turn on Resolution Gate, which you will find under View>Camera Settings. Next, you must frame your shot and, when you are totally happy, select all the transformation channels in the Channel Box for the renderCam, hold down the right-hand mouse button and use Lock Selected.

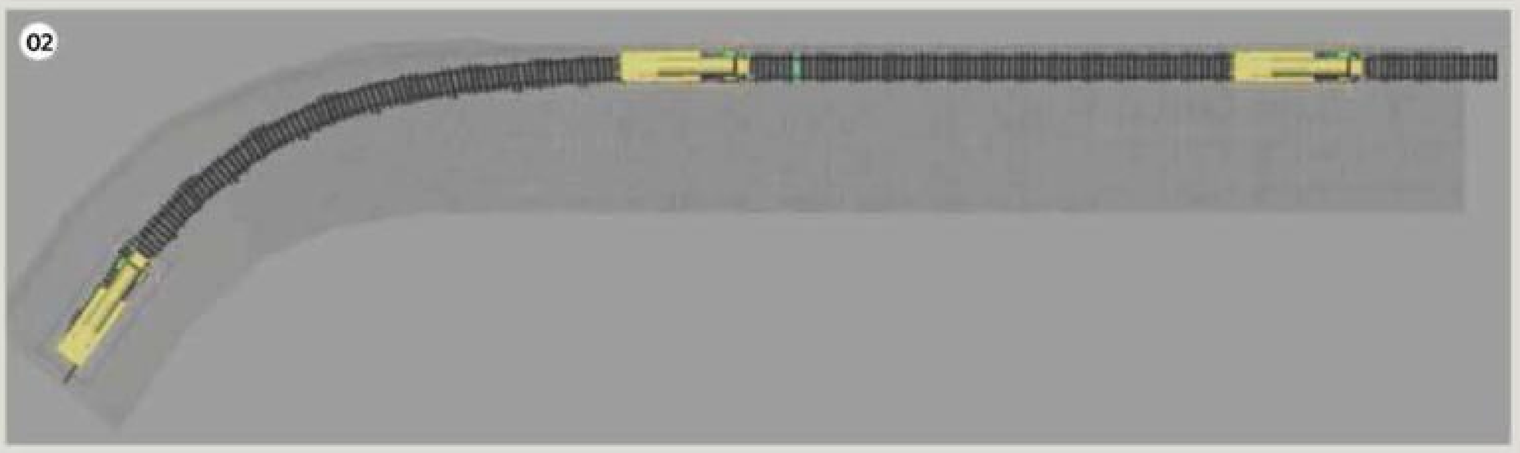


Using Maya Fluids to add smoke and steam to the locomotive

02 Block out the animation

Select the 'loco_global_srt_ctrl' and position and orient the control at the start of the track. This control is used to pop the locomotive at its start position and should be left alone from there. To get it around the corner and then pull up in front of the station, we will use two controls, the 'loco_pathFollow_ctrl' and the 'loco_main_ctrl'. At frame 1, select the loco_pathFollow_ctrl and set a key, then at frame 100, position and orient the train at the other end of the bend using the same control and set another key. Leave that control where it is and select the loco_main_ctrl and set a key at frame 100. Move onto frame 200, and use the translate Z of the loco_main_ctrl to move it in front of the station and set a key. With the locomotive in the same position, set another key at frame 300. Then at frame 400, translate it out of shot and set one more key.

01



02

Back to basics

Clean out animation curves

During the animation process, I tend to hit the keyboard S key to set my keyframes, which will key all the attributes on the selected objects. Later on, I will go through the Graph Editor to clean out the F-curves. Here, I will delete any curves that are purely straight, which indicates no movement. For example, by keying the main_ctrl, we add keyframes to all the translation and rotation channels. The only channel being used is the translate Z, therefore we can get rid of the unrequired curves for every other channel. You can also let Maya delete the keys for you by going Edit>Delete By Type>Static Channels. I have trust issues though, so I prefer to do it myself! You know what they say, F-curve cleanliness is next to Godliness.

03 Add in-between positions

The reason for using the two controls is that if we were to just use one control, say the loco_main_ctrl from start to finish, once we get around the bend we would have to deal with two translation axes, X and Z, to move the locomotive forwards. This can overcomplicate things, so breaking the motion down between the two controls will simplify getting the locomotive along the track in a straight line after the bend. Next you must add in some in-between positions as the locomotive makes the turn. The first in-between sits at frame 50 and then there are a further two in-between keys at frame 25 and 75. Make sure to turn on the 'lower_geo_layer' to check that the wheels are sitting on the tracks. We can add more in-between poses later if needed.

04 Re-timing

Now that we have set the trajectory of the locomotive and have a basic idea of it coming into the station and pulling off again, we really need to go in and get the timing working better. So far, it's probably coming in and leaving far too fast. Using the Graph Editor or the Dopesheet, both of which you will find under Windows>Animation Editors, start shifting the keys around to create a more believable sense of this locomotive slowly coming in, resting for a moment and then taking off again. From analysing the reference, on average it seems to take locomotives around 10 seconds to come to a stop, and then very slowly build up speed to get going again. In total, I ended up increasing the frame count to a total of 1200 for the entire shot.

05 Easing in and easing out

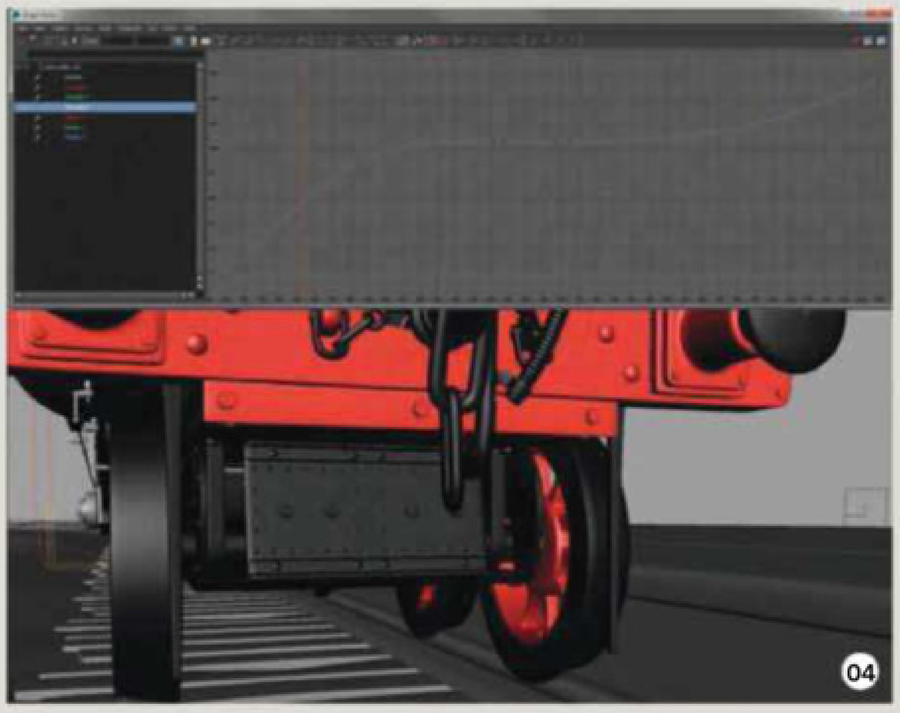
With the bulk of the movement in place, we should now start to work on making it feel as if the engine is gradually decelerating as it comes in and than gradually accelerating as it moves off again. Using the Graph Editor and with the main_ctrl selected, select the F-curve for translate Z and go to Curves> Weighted Tangents, followed by Tangents>Free Tangent Weight. Now you can grab the tangent handles and push and pull them freely. Where the locomotive comes to a stop, create a curve that begins to flatten off very early as opposed to coming in sharply. The flatter a curve, the slower the movement. A purely flat curve will indicate no movement.

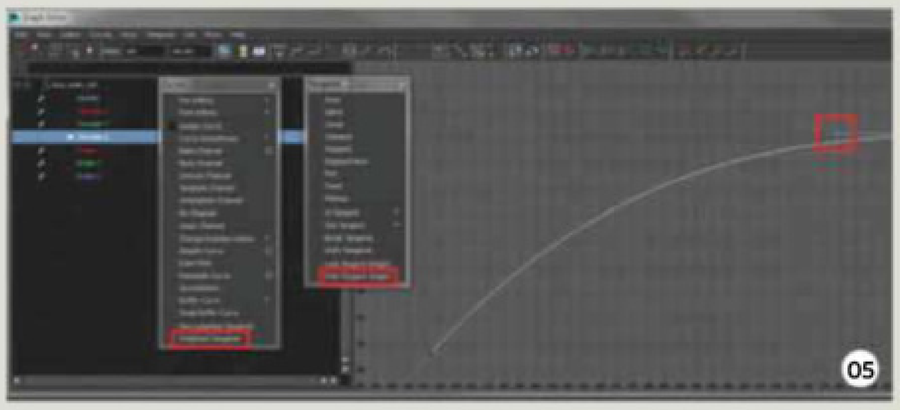
06 Focus on the wheels

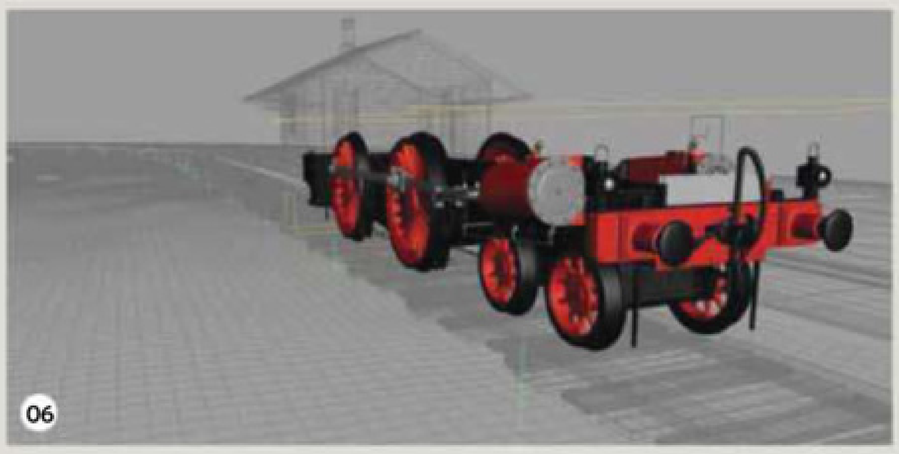
The trouble with wheels is to make sure that they do not feel as if they are sliding (although in saying that, when the wheels of a real locomotive did start to slide, sand was added to remedy it). To get our wheels working in conjunction with the body of the locomotive, first I jotted down the circumference of the wheel, which was around 15.5cm. I then used the Distance Tool, which you will find under Create> Measure Tools, and created two locators: the first at the centre of the back wheel and the second around 15.5cm away, down the track. I then duplicated the locators and offset them by another 15.5cm and so on, all the way down the entire length of the track. Although this is not precise, I could now make sure that every 360-degree turn of the wheel would sit alongside the locators running down the track. All you need to do after that is make sure they slow down and pick up speed correctly in relation to the body of the locomotive.

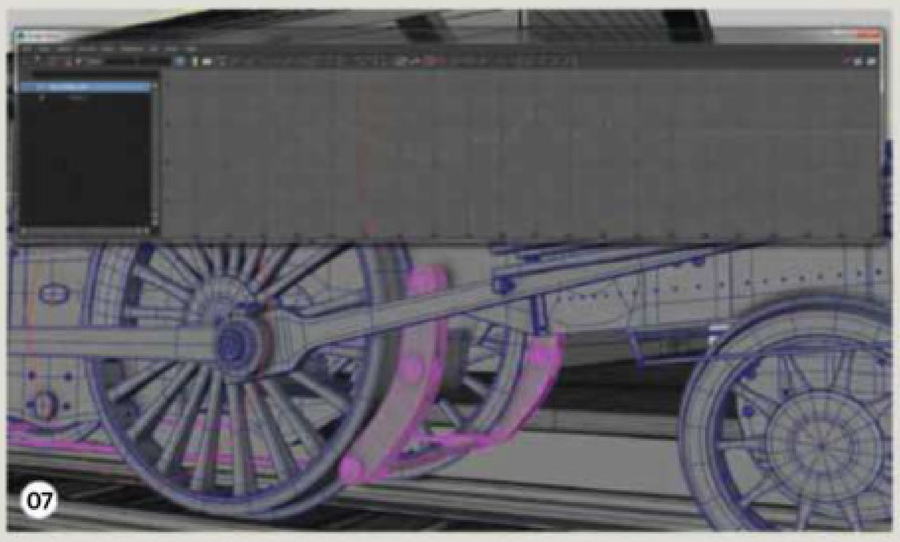
07 Work on the brakes

We are now in a position to add the brakes to bring the wheels to a complete stop. This should be a simple case of using the rotate Z attribute on the loco_brake_ctrl to push against the wheels. As the brakes grind against the wheels, add some subtle back-and-forth movement to make it appear as if the wheels are in contact with the brakes. Just before the locomotive takes off again, slowly release the brakes and play with the curves so they gently ease back into their neutral position. At this stage, all the main motion of the locomotive should be in place, that being the body, the wheels and the brakes.









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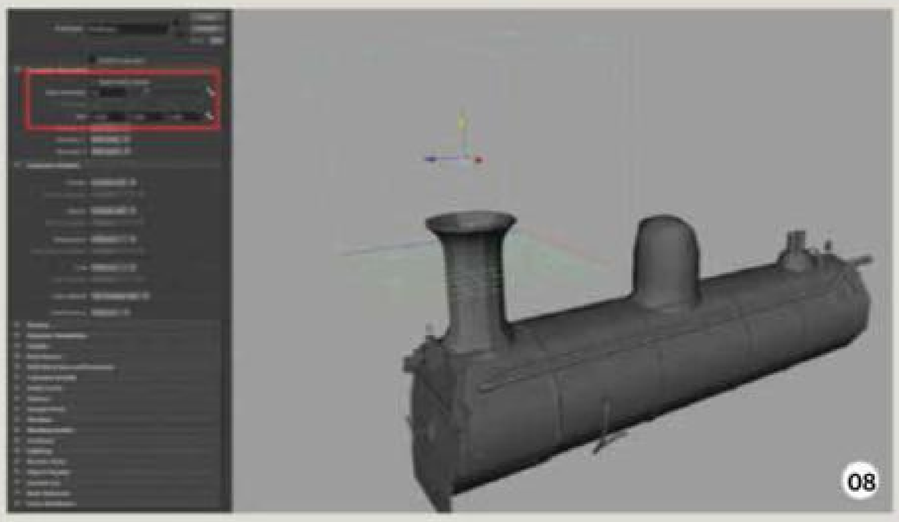
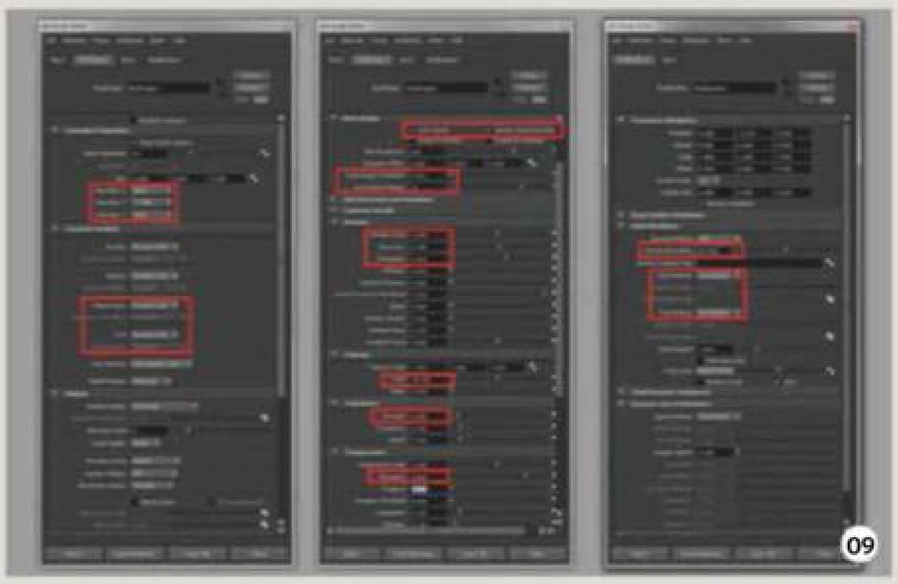


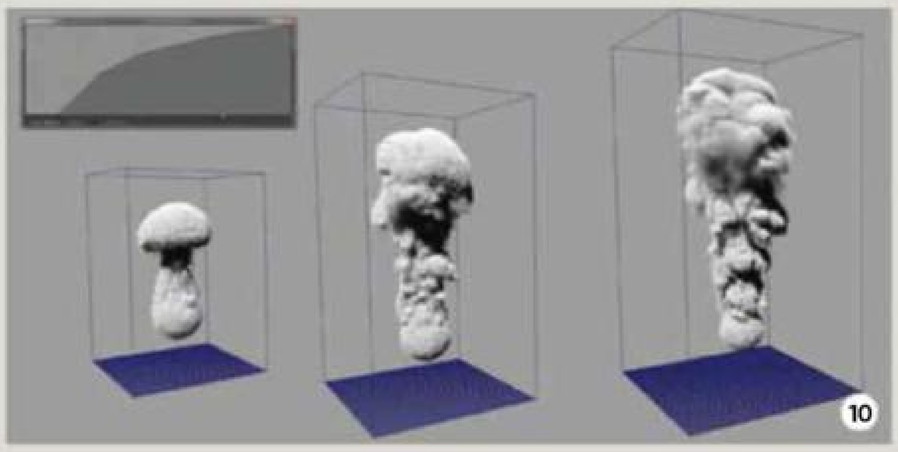
08 Create chimney smoke

Instead of creating the fluid for the steam in our current scene, I decided to work on it in a new scene with a stationary locomotive. The fluid can later be cached out and imported into the final animation scene. Switch to the Dynamics panel and go to Fluid Effects>Create a 3D Container With an Emitter. Position the container to sit over the chimney and pop the emitter towards the bottom of the container. With the fluid container selected, open up the Attribute Editor and in the Container Properties, edit the Base Resolution to 50 and the Size to 5, 5, 5. Make sure to use the Size attribute to edit the container size and not the Scale tool. We can increase the resolution later on, which will obviously in turn increase simulation time.



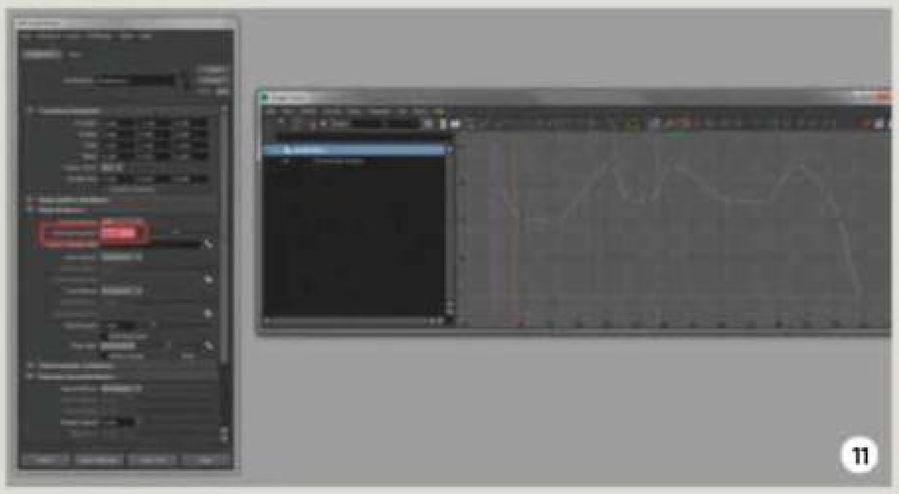
09 Smoke properties

Set the Boundary X and Z to None and Boundary Y to -Y Side. Scroll down to the Contents Method and set Temperature and Fuel to Dynamic Grid. Move on to the Auto Resize tab and enable it. Disable Resize To Emitter and Resize in Substeps. Set the Auto Resize Threshold to 0.010 and the Auto Resize Margin to 15. Continue to Content Details and for the Density, set the Density Scale to 1, the Buoyancy to 0.3 and the Dissipation to 0.6. Moving on to Velocity, set the Swirl to 18. For the Turbulence, set the Strength to 0.080 and in the Temperature tab set the Buoyancy to 6. Lastly, select the fluidEmitter, set the Density/Voxel/Sec to a value of around 30 and then set Heat Method and Fuel Method to No Emission.



10 Fluid shading and lighting

You should now have a plume of smoke that rises. Experiment to get the results that best suit what you're looking for then move on to the Shading tab for the fluid. The following settings worked for the look I was aiming for but you can tinker with them to suit your own desired look. I first lowered the Transparency and gave the Color a ramp that goes from dark grey to almost white. I edited the Opacity graph to be more like a steep hill. In the Shading Quality tab, I set the Render Interpolator to Smooth and for Lighting, I enabled Self Shadow and set the Ambient Color to an off-white colour.



11 Effects and collisons

To add a 'chug chug' effect, select the fluidEmitter and set keys for the Density/Voxel/Sec over time. I took it from a high value of around 30 down to a value of around 5 and then back up and so on. Looking at my animation, I knew that during frames 600 to 800 the locomotive slows down then sets off again. At this stage, I decided to reduce the Density/Voxel/Sec to a value just above 1, then bring it back up as the locomotive departs. To make the smoke collide with the chimney, select both the fluid container and the chimney geometry and go Fluids>Make Collide. To get the best results during collision, you will need to increase the Base Resolution of the fluid.

12 Add wind effects

We must make the smoke look as if the locomotive is moving and the smoke is trailing behind. Select the fluid container and go to Fields>Air. Set the Magnitude to 15 and the Direction to 0, 0, -1. This should push the smoke in the correct direction. Around frame 600 you could reduce the Magnitude to 0 again to create the sense that the locomotive is stationary, and then slowly bring it back up as it takes off once more. To increase the quality, increase the Base Resolution to a value between 150 and 300. Cache out the fluid, bring it into the main animation scene, position and orient it to start off with the animated locomotive and then parent it to the chimney geometry so it can follow along for the ride. Using this method, create the effects of steam being released by the pistons and if you'd like to, the steam whistles blowing off to signal that the locomotive is ready to depart.

Cache out the Fluid effects

If you wish to play back the fluids in a more interactive way or drop them into another scene and get them going again, I highly recommend that you cache them out. To do so, select the Fluid and go Fluid nCache (Options). Set the Cache Format to mcx as, without a doubt, you will be going over 2GB. For File Distribution, I have set the method to One File and finally set the Cache Time Range to Time Slider. Hit Apply and go for a nice coffee break.

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With the disc you will find all necessary project files, reference images and an hour-long video tutorial

3ds Max

Create a walk cycle in 3ds Max

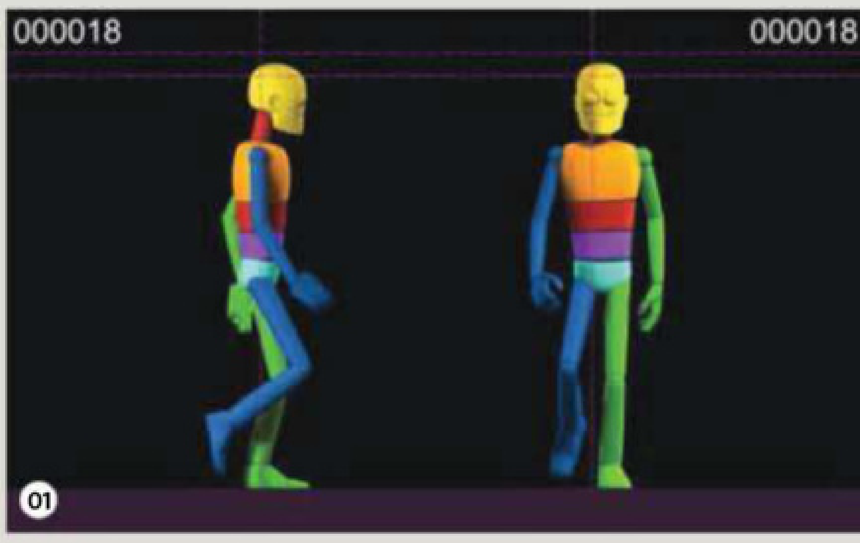
"Can you show me how to animate a simple walk cycle, using the rigged robot character from issue 62?"

One of the most important steps, when starting out in 3D animation is to learn and understand the procedural nature of the technical process. I'm talking about the hands-on tasks and the order in which you do them. Every animation, from the simple to the complex, follows the same technical procedure. That is, if you want to produce good animation.

Here we will look at this procedure and how it applies to a simple walk cycle. Once you understand it, you'll soon realise you can apply it to any animation task. So, for this lesson, don't get too stuck on creativity. Our goal is to learn the technical process, so that you can use it with your next creative-animation project. This process is universally used within the animation industry. This means that with a working knowledge of this system, together with a good set of animation skills, you could easily transition into a collaborative production environment.

It's important to remember that, while animation is a very creative product, it is also highly technical in its construction. A crucial part of this technical process is its very procedural nature. With any 3D project, there are usually multiple options for achieving a desired outcome, however once you decide on a technique, you are somewhat bound by the procedural steps required. For example, A then B then C. You will not arrive at the result you require if you fail to follow the correct procedure. There are exceptions to this rule, however these are rare and definitely not standard.

This principle is certainly true in the following tutorial. To keep things nice and simple, I have broken it down into five steps, with a boxout added for animation that is cycle-based. As with any digital project, we will start out with various preparation procedures. We will then move on to the animation. Finally, we will conclude the project using various assessment and polish techniques. Once you complete the project, you will have a much better idea of the procedure used to create any animation you can imagine. Be sure to check out the hour-long video tutorial supplied with the issue too!



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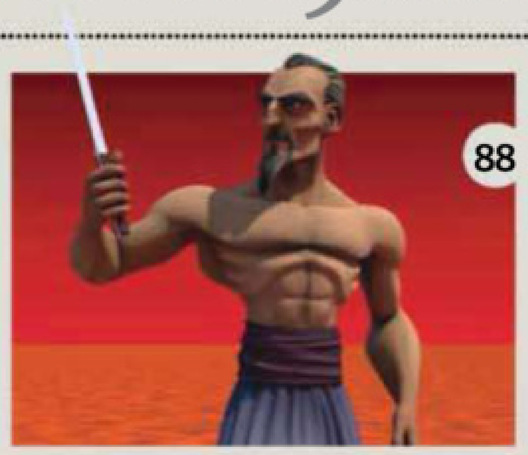
MARI
Daniele Orsetti
www.dayno.it

Daniele has worked in the VFX industry for the past two years. He specialises in grooming, modelling and texturing for feature films. He currently works at MPC in London

CINEMA 4D
Gary Abrehart
www.gazzamataz.com

Gary is a freelance 3D artist and animator with a speciality in character animation. He has worked on a variety of film, broadcast and corporate projects



Send us all of your 3D problems and we'll get them sorted. There are four methods to get in touch with our team of expert advisors...

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01 Prepare your reference

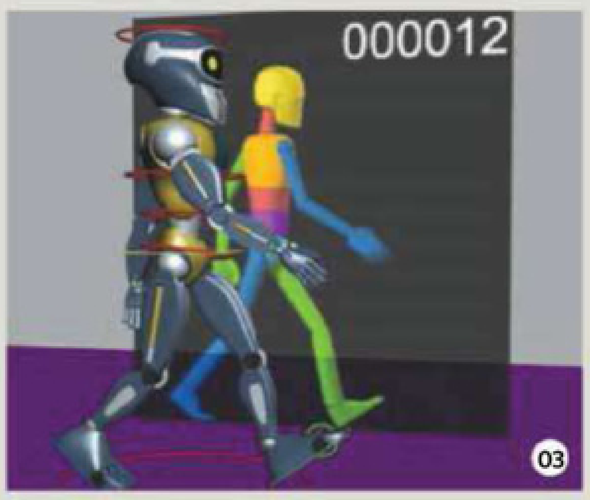
Never animate without reference. The first thing you should always include is a visible time-code. This can be added by taking your footage into After Effects and adding a Timecode text effect on a new layer. Position it in the top corner. If you plan to animate in-place or on-the-spot, amend the reference to reflect this by animating the position of the reference subject in After Effects, using position key-frames.

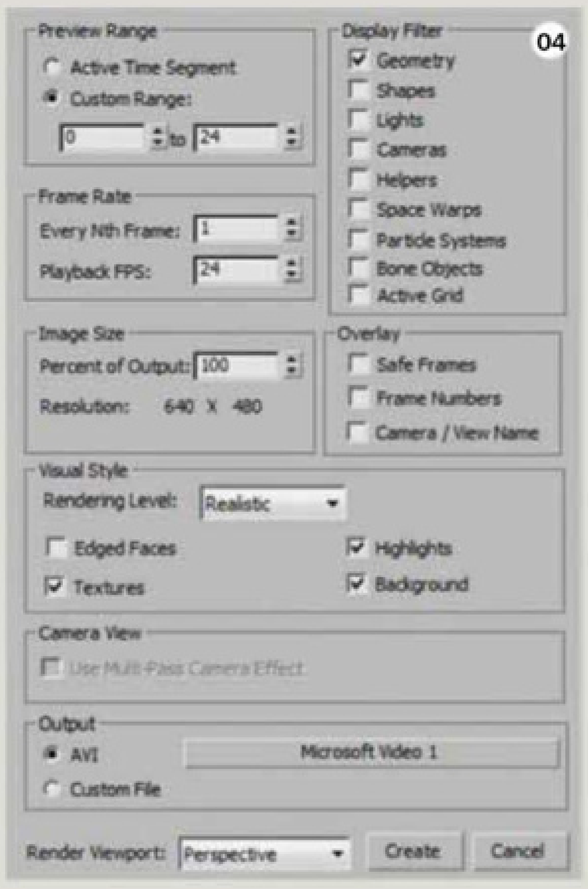
02 Set up the scene

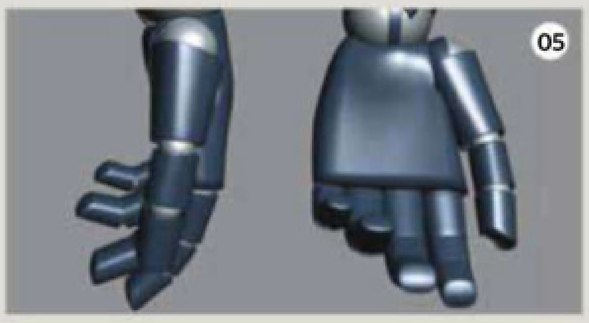
It's important to set up your 3ds Max scene before you start animating. This includes establishing the frame rate (24fps), amount of frames on the timeline, resolution and a project folder structure. You should also Import/Merge all assets into the scene, including the rigged character. Try to use either Selection Sets or Layer Manager to manage your elements. This will allow you to quickly select, freeze, unfreeze, hide and unhide your scene objects. Then create reference Plane objects and texture them with your reference footage. Position these in the scene so that your character lines up correctly. Don't forget to save a start file.

03 Block in the animation

Start by switching on the Autokey function. Using the various animation controllers, this will allow you to simply re-pose the character at specific intervals to match the reference, and animation key-frames will be automatically set. The goal here is to set as few key-frames as possible, while still matching the reference. This makes for a smoother animation. For the hands, feet, toes, knee and elbow pointers, and centre of gravity, set key-frames every third frame (0, 3, 6, 9, 12, 15, 18, 21 and 24). For a cycle, the first and last frames need to be identical. Simply hold Shift then click and drag the zero key-frame to frame 24.







04 Test render and assess

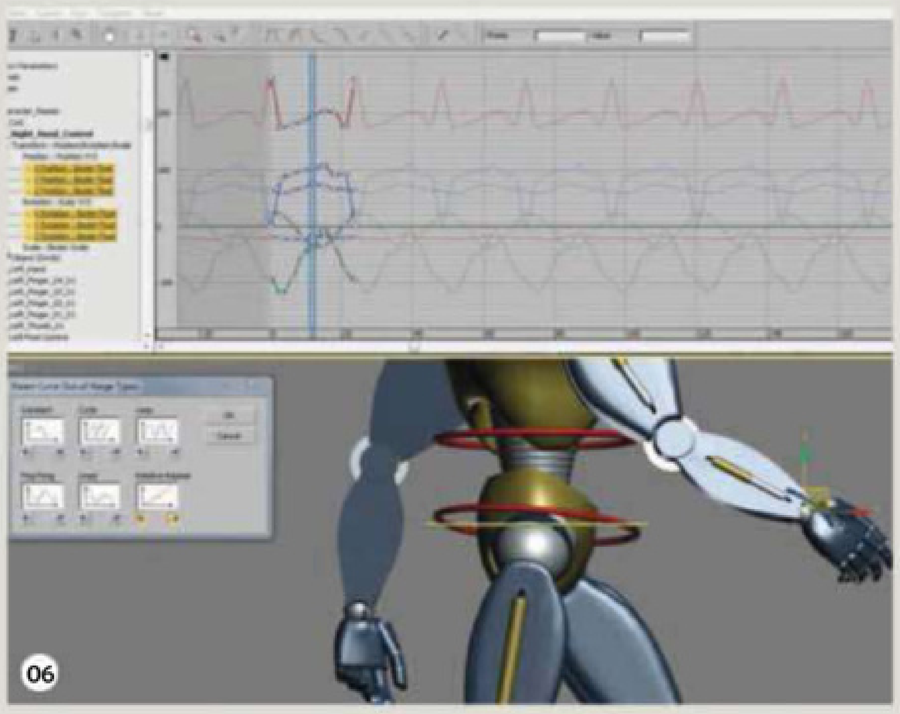
Once you've blocked in all of the animation, do a simple test render. 3ds Max has a great feature for this. Go to Tools>Grab Viewport> Create Animated Sequence File. Adjust the settings to suit the level of detail you prefer and hit Create. When the render completes, it should automatically open your default movie player and play the rendered file. Or you can render from the standard render menu. Just don't trust using Play on the timeline; it's never real-time playback.

05 Polish the walk cycle

The polish stage is where we fix any issues found in the preview render. Make sure you consider all animation angles and not just one perspective. A powerful tool for making sure you have a smooth and organic animation is Trajectories. Simply select an object and right-click to access the Object Properties, then tick the Trajectory switch. Being able to see a virtual path for every part of your animation allows you to address the areas which need further work. Remember curves are very important when animating, and straight lines should be avoided wherever possible. Without using Autokey, you should also set a relaxed pose for the fingers at this stage.

06 Loop the animation

For a cycling animation, as in our walk cycle, there will come a time when you want to extend the animation beyond a single loop. There is a great method of repeating animation in 3ds Max, which is called Out of Range Types. Simply select the animated object, right-click and select Curve Editor. Select all of the key-frames, click on the Edit pull-down menu and select Controller/Out of Range Types. The default type is Constant, however we want to use Relative Repeat for both in and out. Now extend the timeline using the Time Configuration settings, and you should see your animation continue for the whole duration.



Don't forget when Autokey is on

When animating in 3ds Max, there are two main ways to set animation key-frames. You can use the Set Key, which involves pressing a button to set key-frames, or you can use the Autokey method, which sets key-frames automatically when the state of an object changes over time. Both have their advantages and disadvantages. Regardless of which method you use, the important thing is to make sure key-frames are created for your poses and states. Equally important is not accidentally creating key-frames when you don't need or want them. This can easily happen by leaving Autokey switched on and making changes to various objects.

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Tutorial files:

- vintageRadio_final.obj (the 3D model of the radio)

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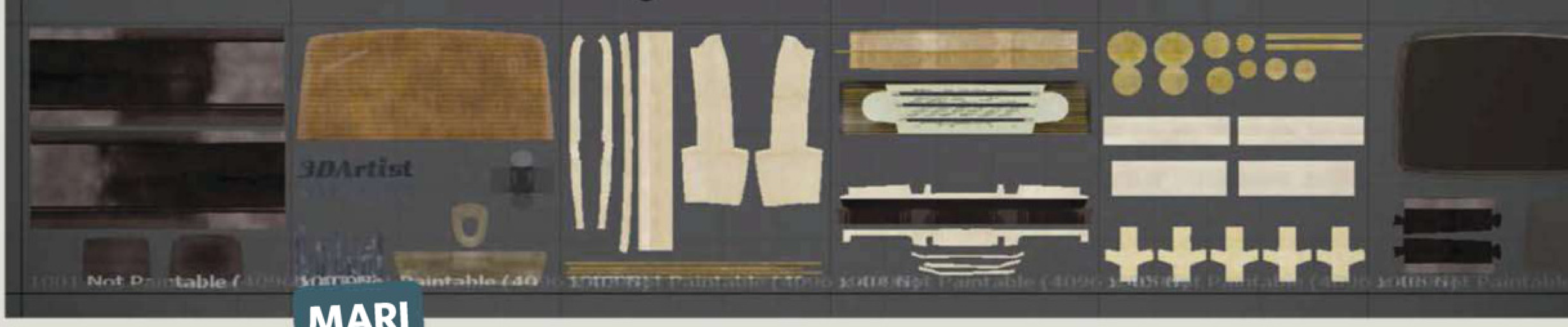


MARI

Quick and efficient texturing

How can I use MARI to quickly create a colour texture for a prop?

In a production environment, artists are often required to create a first pass of a colour texture as quickly as possible. Being organised and keeping your workflow flexible is key for painlessly addressing the requests of a client or supervisor, and promptly generating different variations of the same texture.

MARI has been specifically designed to help artists achieve the speed and flexibility they need in their everyday tasks. It can handle very high-resolution geometries and animated caches, and gives you the opportunity to work on multiple versions of an object at the same time.

Even more importantly, it enables artists to work directly in 3D, without having to worry about cleaning up texture seams.

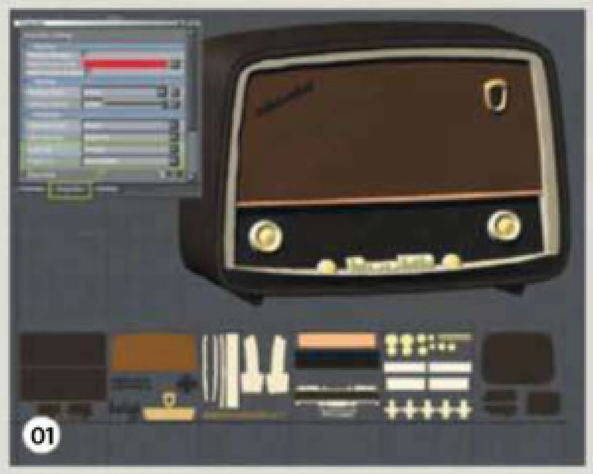
Any painting software would not be complete without layers, and MARI has an integrated Photoshop-like system to handle them. It also offers procedurals and the ability to create layered masks. Elements can also be shared in the layer stack, giving the artists total control over their workflow.

In this tutorial we will discuss how to use MARI in a production-friendly and non-destructive manner. To illustrate this example we will block out the colour texture for a vintage radio prop.

The 3D model has six UV tiles, so we can use multiple images per channel to keep a high level of detail without needing to generate incredibly high-resolution textures. To keep our work flexible, we will try to take advantage of MARI's procedural modules as much as we can.

We will start by creating a flat coloured base for all the different parts of our radio to define its colour palette and offer a fast overview of its look. We will then discuss various methods to seamlessly project more details onto the model, and we'll finish by creating a quick dust pass.

This workflow can be achieved in MARI, but you must use Photoshop if you want to create and edit tileable images or clean up shadows from a photo reference. In its current form, MARI only enables users to perform basic tweaks on source images, such as crops or the application of filters.



01 Define the colour palette

It's important to rough out the general look of your prop quickly, especially if you're working closely with clients who need a quick turnaround on look development. Import the radio model supplied into MARI, create a 4K channel using the Quick Create menu in the Layer Palette, and paint the different colours of our radio on a layer. To increase the speed, activate the options Projection>Through and Project On>Selected Only in the Projection palette. This will isolate the bits we select, so you can colour them in a couple of strokes.

02 Block out the radio cloth

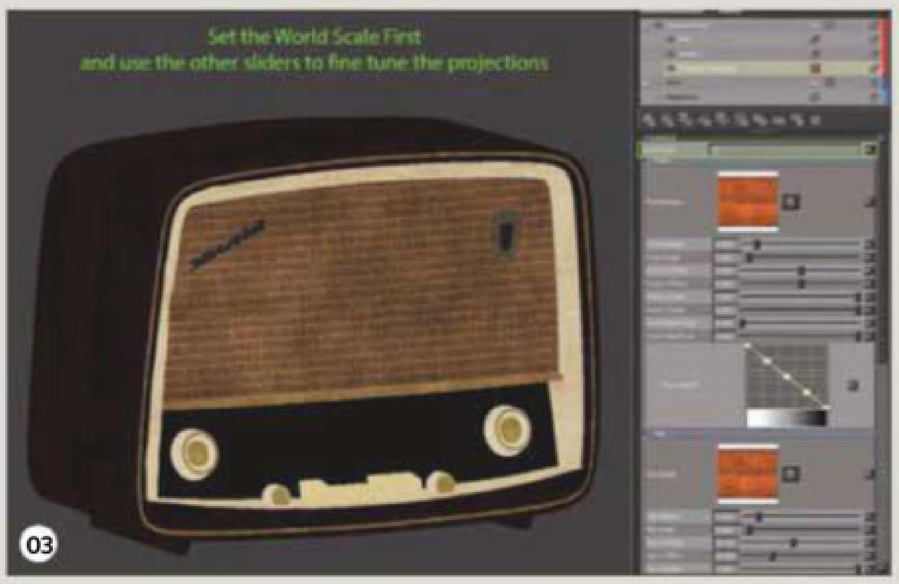
Start adding detail using the first procedural module. Create a group, then go into Add Procedural Layer>Pattern>Tiled and move the tiled layer inside it. Now we can create adjustments that will only affect layers inside the group. Source your tiled texture in the layer options and adjust its scale and rotation. Create a mask for the group by right clicking it and selecting Layer Mask>Add Mask>Hide All, then paint in the radio cloth in white. Add as many adjustment layers as you wish to modify the look of your tiling texture. To add more variation, create a cloud noise (Add Procedural Layer>Fractal>Cloud) and blend it with the tiled layer in overlay mode, adjusting its opacity for a subtler effect.

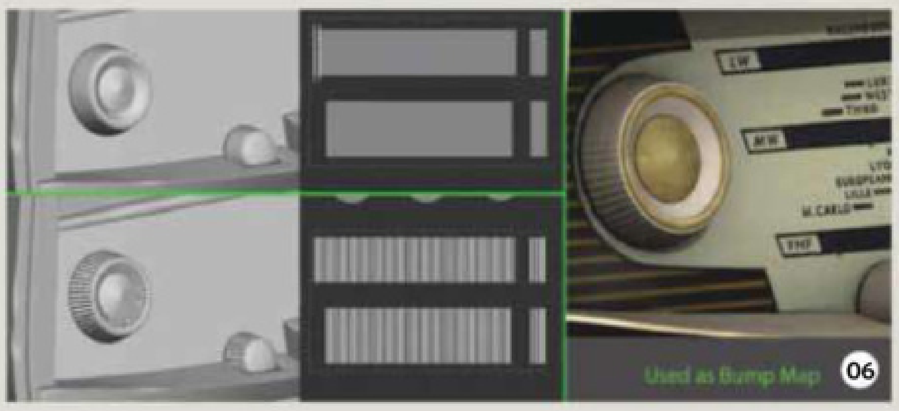
03 Create seamless texture projections

The best way to seamlessly add detail to our radio is to create a tri planar projection. The Tiled layer we used before repeats a texture in the 2D UV space, but this procedural layer lets us project the images directly in 3D along the XYZ axes, and lets us control how the different projections blend together. Create your first tri planar projection layer (Add Procedural Layer>Environment>Tri Planar Projection) and plug in a wood texture. Adjust the World Scale parameter first and then play with the blend sliders. You can also rotate your images in different ways for every plane, to achieve different looks. Create a new group and use the same workflow as in step 2 to adjust your textures. Use the same method to add detail on the other plastic and metallic parts of the radio.

04 Project and adjust the display

The radio display is the only image we will have to place by hand onto the geometry. Create a new paint layer, then select the display in the 3D view (make sure your Select Items tool is set to Smart Selection Mode and set Selection Mode to Faces). Check that your projection options are still set to Projection>Through and Project On>Selected Only on select meshes. Import a display image in MARI's image manager palette and drag it directly into the viewport. This will automatically activate the Paint Through tool. Quickly project the display on the geometry and then adjust its position using the Warp tool. This tool is more flexible than the Photoshop counterpart, as it gives us the ability to add or remove control points without losing the tweaks we performed at a lower level of detail. Adjust it using the up and down keys.





Create a channel to store your masks

It can be useful to create a channel to store the masks that you use more frequently – for example, to isolate part of the geometry or all the metallic materials. This way you can simply copy/paste them into a newly created mask or share them into a Mask Stack so if you edit your original, all the others will be automatically updated.

05 Create a quick dust pass

Dust usually accumulates on the top of surfaces. First, isolate the parts of the radio that are pointing up. Create a surface normal layer, then create and position on top of it a copy channel one and set it to green. This way, if you have to change the model or its UVs, your mask will automatically update and still be consistent with the new geometries. To break up the mask edges, create a cloud noise texture and use advanced blending to automatically mask where the procedural mask is not 100% white. For variation, create another cloud noise and set it to multiply on everything, and add adjustment layers to better control the look of your dust map. Put all layers in a group and set it to blend with the other textures in Screen mode. Adjust the opacity to find your desired look.

06 Add fine details with tiled projections

Now add some fine detail to the knobs, which we can use in both our colour and bump map. Import a black and white tileable gradient image into MARI. Switch to the Ortho/UV view and isolate the UV shells of the knobs with a rectangular marquee. Drag and drop the image in the UV view but, instead of manually painting it, press ; and then '. This will make the gradient tileable and will stamp it everywhere inside your selection. Repeat the process, adjusting the scale and checking the result in the 3D view, until you are happy. Set the map to multiply. You can also share the same layer in your bump channel if you are planning to create one.

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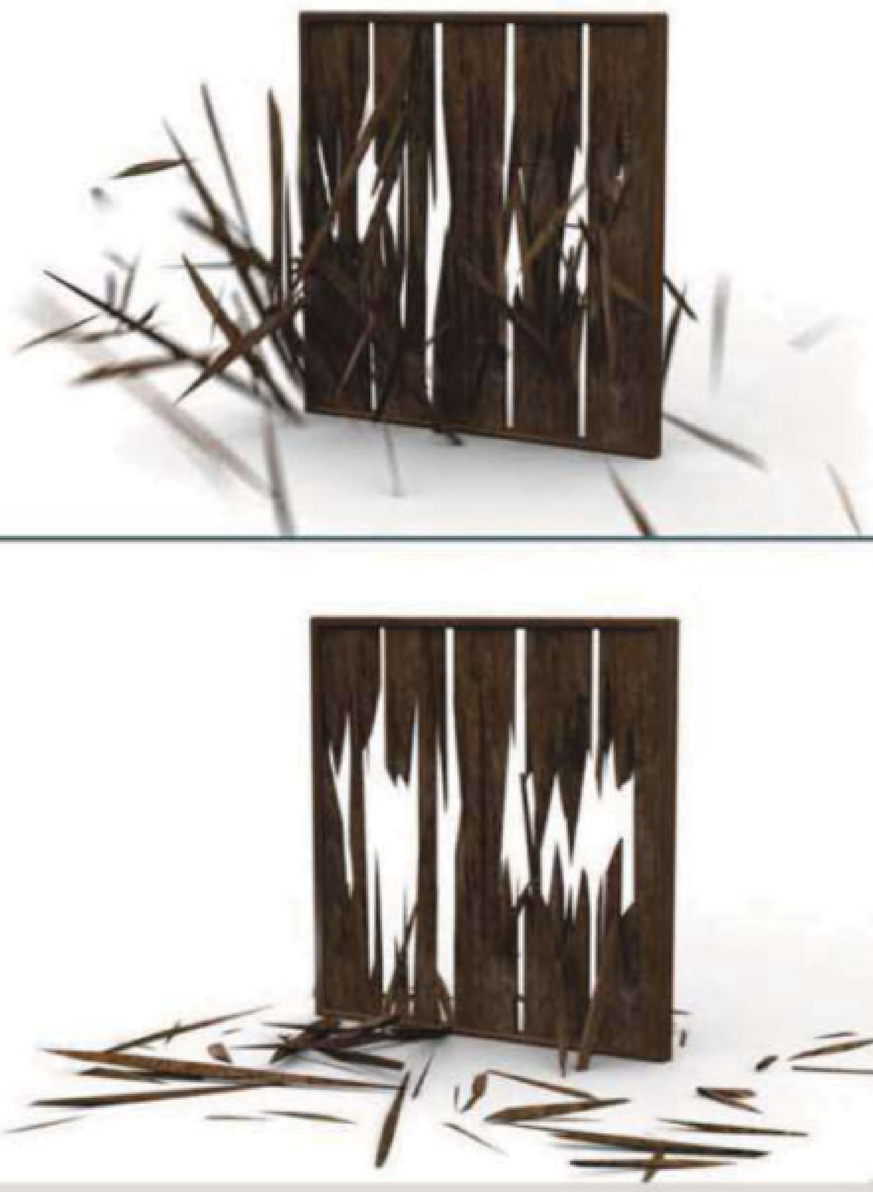


With the Disc

Tutorial files:
Each individual step as a saved .max file (3ds Max 2014) and an alternative example of force

ESTIMATED TIME TO COMPLETE THE TUTORIAL

30 MINS

3dsMax 2014, RayFire

Realistically splinter wood with PFlow

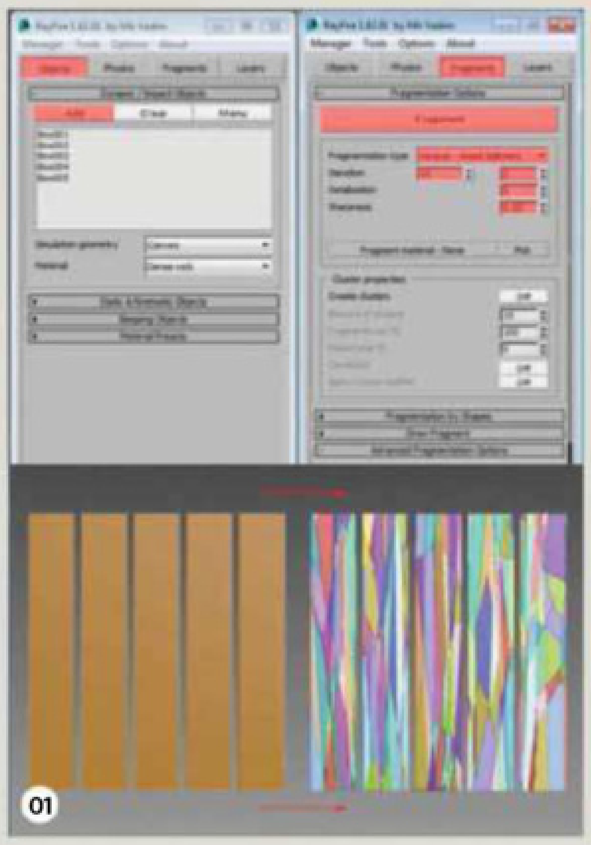
> How can you create a simple wood splintering/explosion setup using mParticles?

This tutorial focuses on mParticles, the new PhysX particle integration of the old PFlow Toolbox #2 that has been a native part of 3ds Max since the 2014 version. This tutorial could be accomplished with RayFire alone, but I also want to show you how you can set up a basic wood splinter/explosion using 3ds Max native tools. The same setup works for window glass and objects crashing through wood or glass, so it's a multi-discipline tutorial. You will learn how to prepare objects to work properly with mParticles before simulation. For the explosion motion we will use a PBomb, but it would work with other space warps, like Wind (a 3ds Max file is available with the disc to see the alternative force).

By using a particle system you will have great control over the simulation's behaviour. Once your fragments are inside the mParticles world, you have the full range of particle operators in 3ds Max available to control them. A very useful tip when adding additional detail is to bake the particles once you are happy with the motion, and add a noise modifier and/or displacement maps.

If you don't have RayFire this is in now way a show stopper. There are several free Voronoi shattering scripts on ScriptSpot. I particularly like this one: http://www.scriptspot.com/3ds-max/scripts/fracture-voronoi.

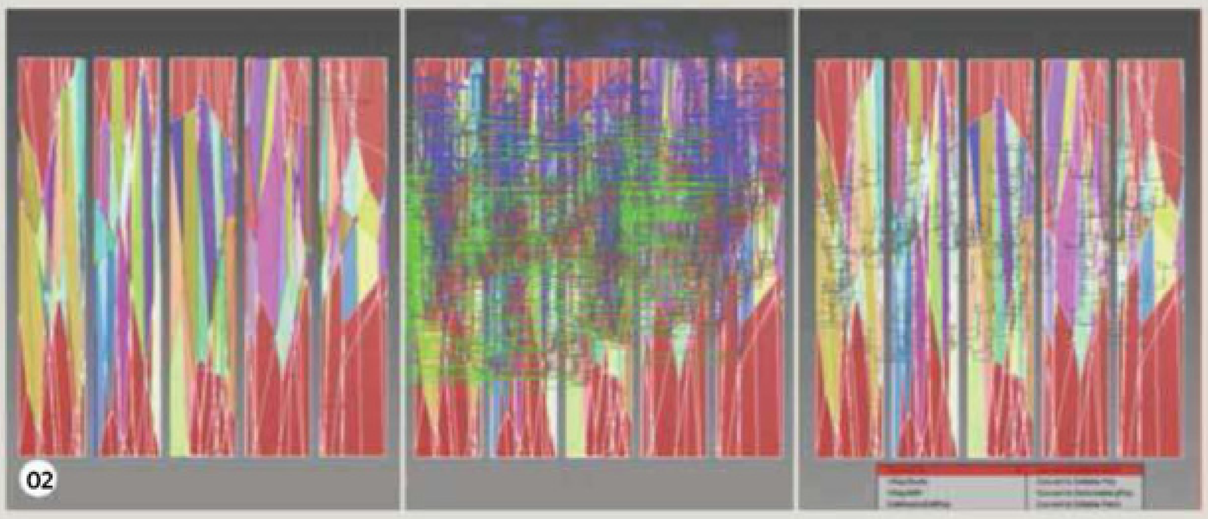
Also, an essential MaxScript when working with particles is the PFlow Baker. You can use it to bake particle animations for farm rendering: http://www.scriptspot.com/3ds-max/scripts/pflow-baker.



01

01 Fragment the boards with RayFire

Create a few boxes as the wooden boards you want to break. Open RayFire and load them into the Impact Object list. Go to the fragmentation tab and switch the type to Voronoi – Wood Splinters. Depending on the amount of splinters you prefer, set your fragmentation settings. I went with an Iteration amount of 15 splinters per object with a random amount of 2 to get a different look per board. I set a Detalization of 2 and Sharpness of 0.55.



02 Prepare the wood splinters for mParticles

Now we have our wooden boards fragmented, we must prepare them for mParticles. First, select and attach all the fragments that you don't want to participate in the simulation; for example, the outer pieces. Next, select all pieces and centre all pivots. This is important, because the pivot will define the spin axis of each particle. Lastly, reset the XForm in case your objects were scaled, and collapse all pieces to editable meshes. Edit meshes are older than edit polys but carry less data and can speed up the simulation time.

03 Create a default mParticles flow

Now it's time to create our particle system. Hit the 6 key on your keyboard to open the Particle View. Along the bottom you will see the depot of standard flows and operators. Pick the mParticles Flow and drag it into the Particle View. If you scrub your timeline you will see the particles falling and colliding with the floor and other particles with accurate shape collisions. Now replace the Birth Grid with a Birth Group, add in all your splinter shapes that you want to participate in the simulation and switch the mP Shape Collide As to Convex Hull for a more accurate collision shape.

04 Add collision objects

We want the particles to collide with the outer wood pieces and other objects in the scene. Drop a PFlow Collision Shape World Space Modifier onto everything you want to be a collision object. I picked just the outer boards. For mParticles to 'see' the collision objects, we need to drag an mP Collision Operator under the mP World. This is very important. PhysX test operators should always be under the mP World operator to work properly. Now add all objects to which you added the Collision Modifier. When you play the system back now, every piece should collide with the other scene objects. For moving objects crashing through the wood, set the World Space modifier to Animated Surface.

05 Drop the bomb

In order to blow out the splinters, we need force. Create a PBomb from the Forces menu. For a messy explosion, you should add lots of chaos. Pick the Start Time for when you want the bomb to go off. For mParticles to stay absolutely put until something happens, you can add an mP Switch and set it to Turn Off Simulation with a time interval until the bomb kicks in, ideally one frame before the boom. Add an mP Force operator and add the PBomb. Set the Force Type to Surface to have accurate behaviour and lower the Influence but, at the same time, raise the Exponent. Play with those two values until you like the result.

06 Adding Spin and test for motion

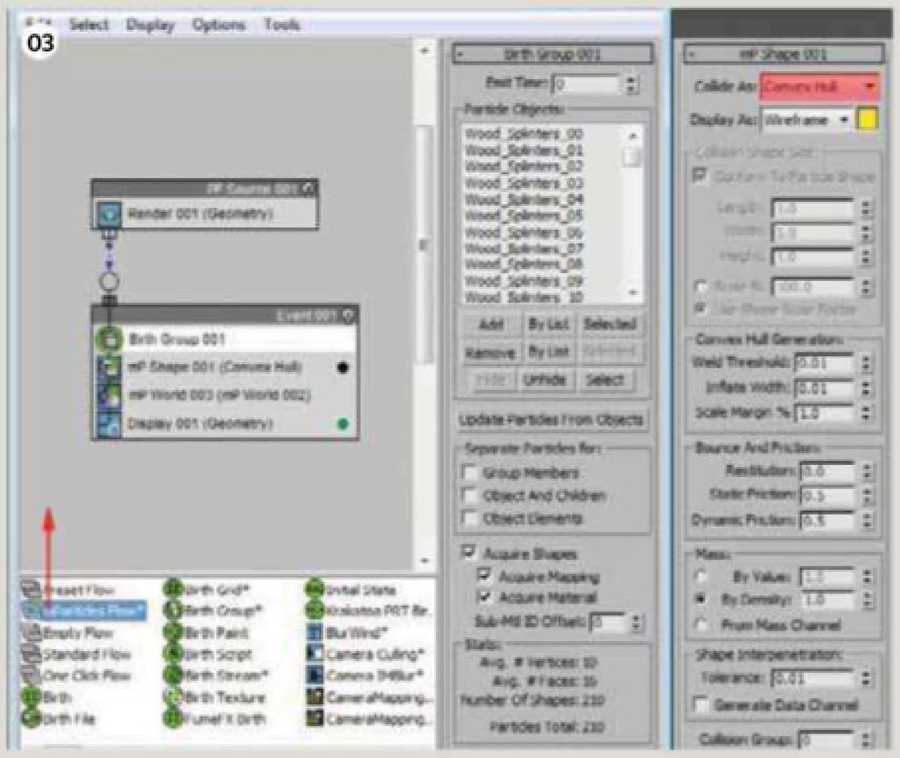
When the particles are on the go, we want them to spin, but certainly not when they are static. This can easily be tested with a Speed Test. If particles cross a velocity threshold they get passed on to a new event. So, drag a Speed Test under the mP Collision Test and lower the Velocity Magnitude Test Value to 200 or lower. Now shift+drag the mP World under the Event01 to create a new event. The mP World has to be in every event that has PhysX. Now connect the Speed Test with that event. Add a Spin operator with high spin values, since the explosion is quick. For mParticles to obey legacy operators like Spin, we need an mP Switch again. Check Match Spin.

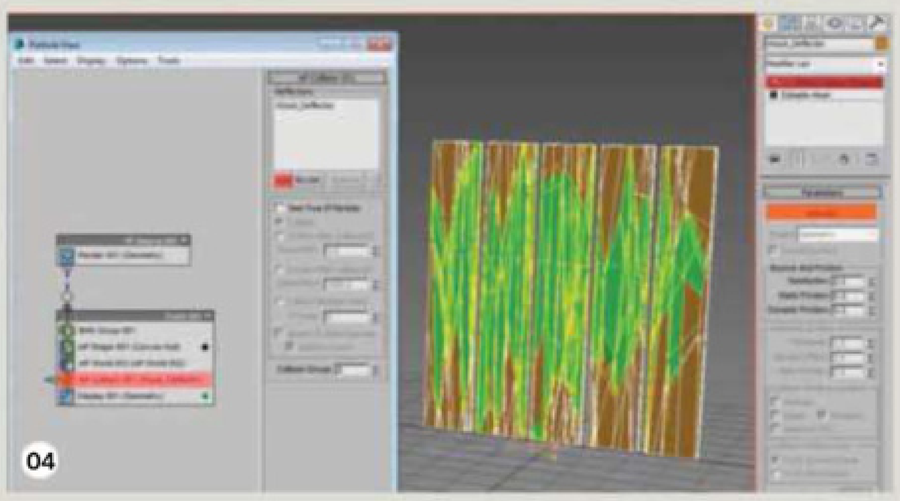
Baking extra detail after simulation

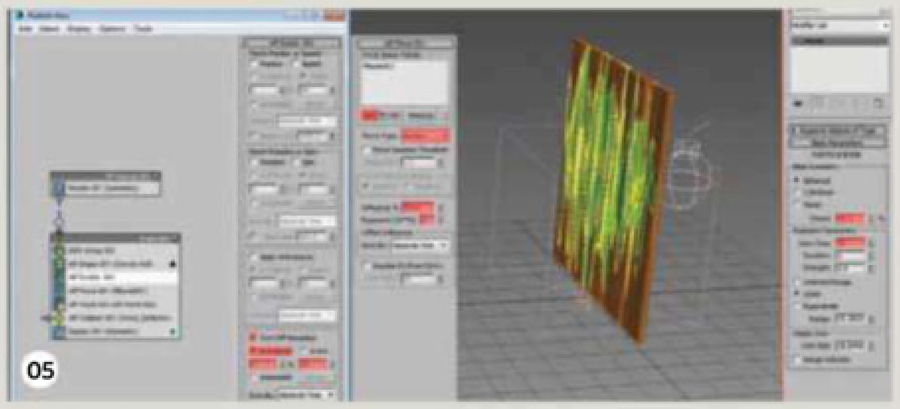
When you fracture your splinters with RayFire, set the cracked-edge material ID to something different to the original wood surface, and bake your simulation with Pflow-Baker. You can then spawn tiny particles off the cracked edges for additional detail. Create a new particle system with a Position Object Operator and spawn off the cracked edge ID by checking Density By Grayscale and Use Sub-Material with the ID you gave the cracked edges.

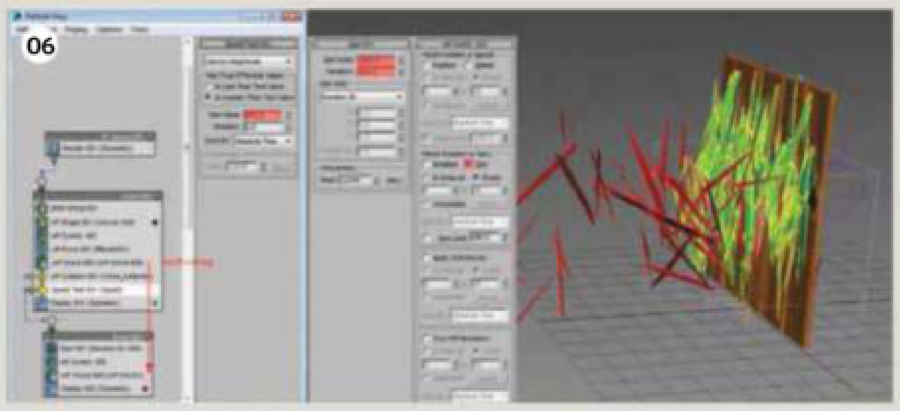
mP World: More steps equals more accuracy/stiffness

When working with mParticles, the overall stiffness and accuracy can be controlled in two ways: global particle Subframe Sampling and in the mP World Helper. If a simulation tends to explode or be too crazy overall, it might just need more samples. Higher Subframe Sampling causes the PhysX engine to keep things in more in check. To slow things down globally, the mP World Helper has a Time Scale spinner. This is a great way to slow things down when you are already happy with the overall motion. To prevent 'PhysXplosion' adjust the Sleep Thresholds and Frictions as well as Convex Hull Generation settings in the mP Shape operator.









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ESTIMATED TIME TO COMPLETE THE TUTORIAL

2.5 HOURS

With the Disc

Tutorial files:
- Blocked out C4D scene
- C4D and Xref character
- Finished animation

CINEMA 4D

Using constraints in CINEMA 4D

"How can I have a character pick up and throw a knife in CINEMA 4D?"

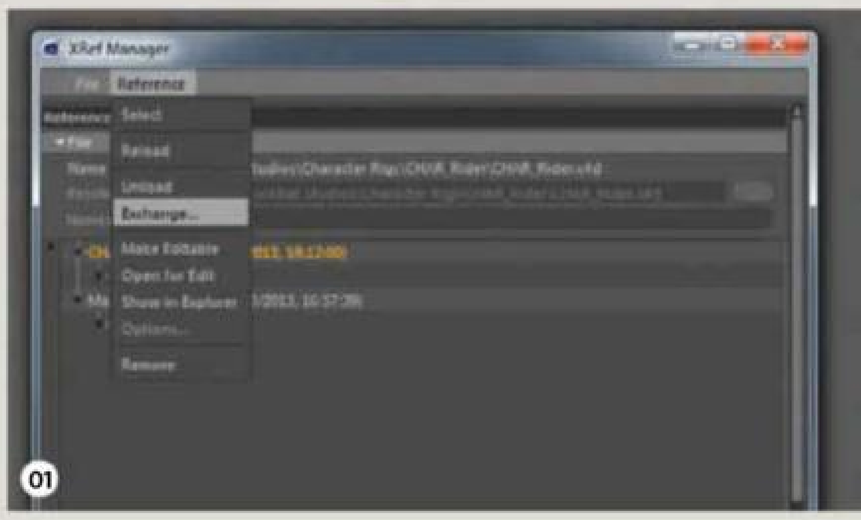
While Maya seems to be the main app used for character animation these days, CINEMA 4D from version R13 onwards has introduced a suite of tools that make it easier to rig and animate characters. So, while the majority of CINEMA 4D users probably work in motion graphics, it can and is being used as a character animation package. I am more than familiar with this, because I have worked on two films and a television show using C4D.

I like using C4D for most of my work because it is a lot easier to use than some of the other applications available. One of its main advantages is that you can have more than one file open at a time, allowing you to cut and paste an item for closer inspection if something isn't working. You can then view it in detail, fix it and paste it back into your scene. Getting a render out of C4D is much easier too, and with V-Ray available for C4D it makes it an even more attractive option.

Included with the new character tools is the Character object, which allows users to create rigs for characters, including advanced bipeds, birds and quadrupeds. Then, using CMotion, you can create various walk cycles from which you can set stride lengths and get your character to walk/fly along a path/surface. There's also the Xref system, which allows users to create references for their characters. I find this particularly useful when weight painting. I often find that when you have painted weights on your character, there is a pose where your weights still need tweaking in a certain area. Xref allows you to modify or even change the character.

There is also a motion system for creating sequences like walks/runs and jumps, and then blend them together.

Most tutorials I have seen for CINEMA 4D have only covered basic rigging and animating a walk cycle. In this tutorial I am going to do something a little different. I am going to be using the Scorpion Rider in my scene, which I recently animated for a 10-minute animated short film *The Ottoman* (www.the-ottoman.com). Using constraints, I will have him pick up a knife, establish some good poses, and then throw it.



01

01 Create the Xref

Open the file Knife Throw.c4d. An Xref object, Knife Thrower, is already in the scene with blocked-out animation using a Character object. It has no geometry, since I am not permitted to give access to the Rider character. Go to the menu Create>Xref>Xref Manager to swap out this character for your own – just make sure it uses C4D's character tool Advanced Biped Rig. The animation is only blocked out because you'll need to modify it to suit your character anyway. Working on this character yourself will help improve your animation skills.

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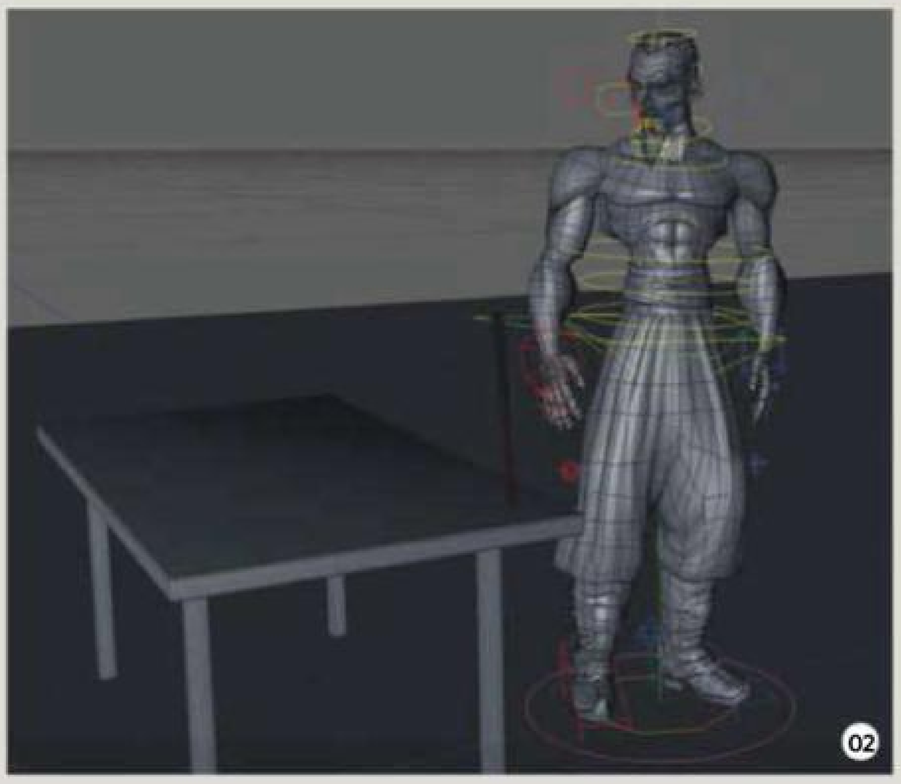


02 Set initial keys/pose

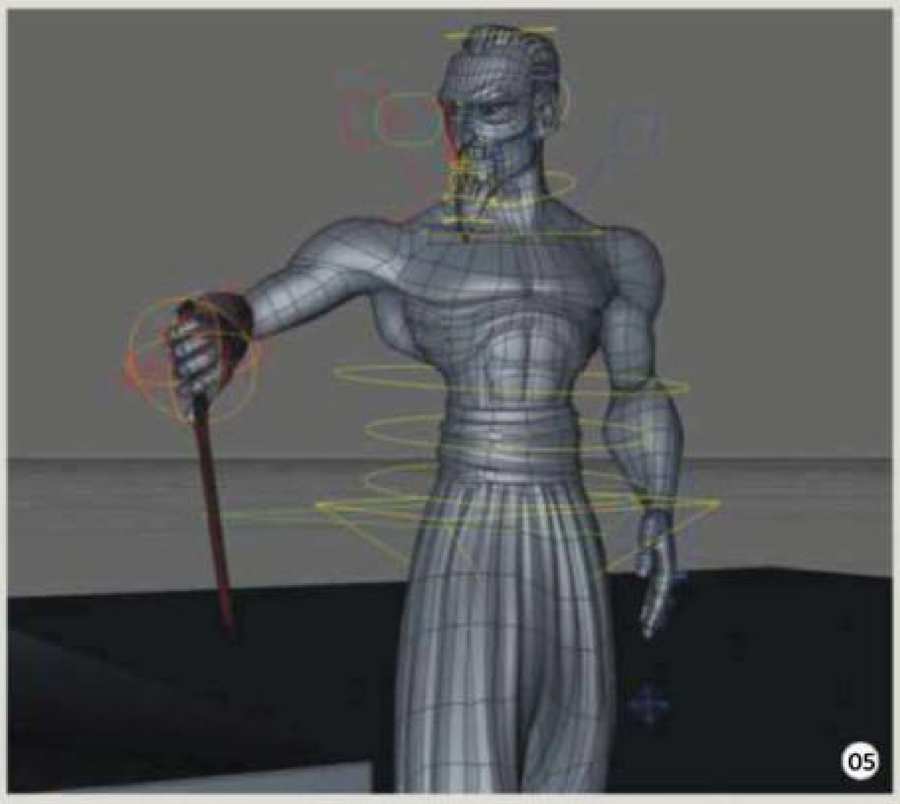
The first step is to make sure there are key frames for all of the main body parts, such as the chest, head, legs and arms in the initial pose. I will be using IK for the arms, so I will not need to change the settings because the rig is using IK by default. I prefer using Automatic key framing, so all you need to do is hit the keyboard shortcut Ctrl/Cmd + F9 and the keys will be made when you pose the character.

03 Grabbing the knife

Go to the pose where the character is leaning over to the knife with his hand around the handle. There is a breakdown pose between this pose and the first one, so that the hand does not glide through the knife geometry. You will find it useful to group the knife object to itself, as you want to constrain this Knife Null to the hand controller on the character. This then gives us the option of moving the knife below the null around in the character's hand once he has picked it up.

04 Constrain the knife to the hand

The difficult bit is to constrain the knife to the hand. Make sure that you turn off auto-keyframing. First, select the Knife Null, then right-click and select Character Tags>Constraint in the object manager. In the attributes manager for the constraint, check Parent. In the Parent tab, set the strength to 0%. Check Maintain Original and make sure that P (position) and R (rotation) are also checked. Now lock the manager by clicking the padlock icon and click the hand controller of the character in the main view port. In the object manager menu select View>Scroll to First Active; the hand controller should now be selected. Drag and drop this to the Target field of the Constraint box options. Finally, control-click on the little circle next to the Strength option in order to key frame it.



05 Move the hand and constrained knife

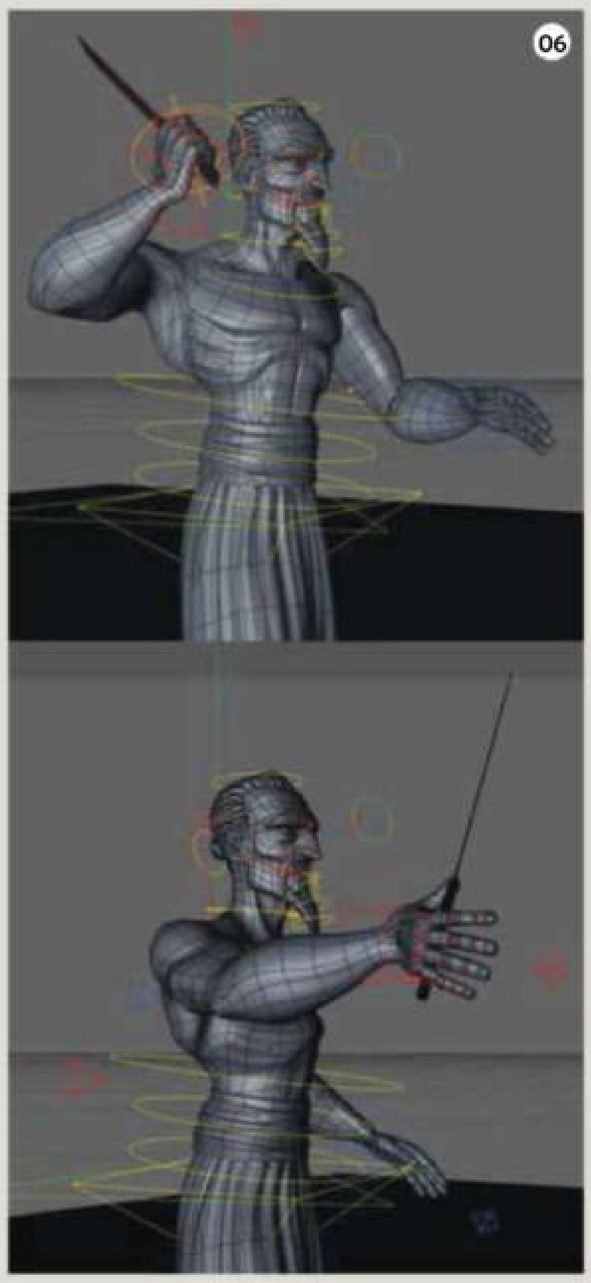
Now you have constrained the knife to the hand. However, the knife will not move because the strength was set to 0%. Move forward one frame in the timeline, and then set the strength to 100% and keyframe it. Also, put a keyframe on the hand controller. Now your knife will move with the hand. We can also reposition the knife by selecting it (not the null it is parented to, but the null below) and moving it. This is useful if you want to tighten the grip and need to move the knife.

C4D character tips

When animating a character, the timeline can get a bit confusing as you are searching for animated items. I always put a keyframe on the Xref or master controller object itself on frame 1 which helps, especially if you have lots of animated objects. You might also find that, when using constraints in C4D, the constrained object sometimes seems to jump around. This is because C4D needs to calculate everything. To stop this, all you need do is scrub through the timeline to frame 1, and everything should jump to its correct place.

06 Throwing the knife

I am going to jump to the pose where the character is about to throw the knife. If you look at the screengrab, the character's hand is posed just before the hand opens and the knife leaves his hand. You can do two things: either animate the knife object below the Knife Null, or animate the constraint so that the knife becomes unconstrained. We'll animate the constraint. Select the Constraint tag on the Knife Null, add a keyframe to the Strength and keyframe the position and rotation of the Knife Null. Move forwards one frame, turn the strength down to 0% and key it. Now you will be able to animate the knife flying through the air over a few frames.



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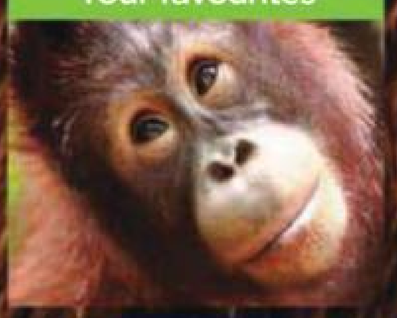

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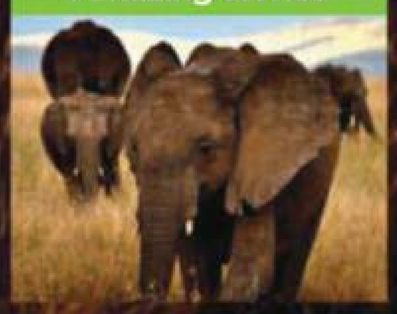

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Soldier 2013

I really wanted to create a soldier character that didn't fall into the typical alpha male category. I went with a more natural look for a realistic presentation of a soldier inspired by a couple of photos that I found online. It was definitely a great experience working on this one.

I made this...

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Artistinfo

Hasan Bajramovic

Website www.hasanbajramovic.com
Country Bosnia and Herzegovina
Software used 3ds Max, MARI, Photoshop, V-Ray, ZBrush
Bio Hasan Bajramovic is a senior freelance CG artist based in Bosnia and Herzegovina

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The final result of a rainforest image using photometric atmosphere. Minor postwork was completed in Photoshop and Filter Forge

Vue xStream 2014

The powerful features in Vue xStream 2014 open new doors for both individual artists and professionals in the production pipeline

REVIEW BY Drea Horvath. Drea has been working with Vue for more than five years. Her main areas of expertise are 3D environment design, composition, lighting and atmospheric effects. She is the co-founder of D&D Creations, a multimedia company located in The Netherlands.

As an increasing number of major VFX studios incorporate Vue into their pipeline – due to its exceptional capacity for handling detailed, complex, rich, natural 3D environments – the developers at e-on Software continue to work on improving and optimising Vue, making it an essential part of any production. Indeed, the new features and improvements in Vue 2014 offer several new possibilities for both standalone use and as an integrated workflow solution.

The main focus of Vue xStream 2014's new features seems to be spread across two aspects: making the natural environments feel even more realistic, and making Vue's integration with other applications in a production far more convenient.

One of the most impressive new features – that both standalone users and team productions can benefit from – is the physically accurate Photometric Atmosphere model, which perfectly simulates the relative intensity of the sunlight and indirect lighting or other artificial light sources. If you use this model, you will immediately notice the improved quality in lighting, especially on areas with indirect lighting. This model requires an increased render time, but it results in a far more realistic final image. If you use this model, you are able to choose whether you let Vue automatically adjust the atmosphere and the camera exposure, or you can keep the current settings and manually adjust them yourself.

To get the best out of this new feature, an extra button has been added next to the Exposure adjustment slider in Post render options, where you can adjust exposure using shutter speed, film speed (or ISO value) and f-number settings, just as if you were using a real camera. Here you will also find the newly added Tone Mapping filters, which simulate the response of the human eye or chemical photographic film. If Post render options haven't played much of a role in your use of Vue before, from now on they definitely will.

In Vue 2014, you can also set the real-world position of the Sun. Using a map you can select the location of your scene, and then set the time, date and orientation. This new feature is especially useful if you need to recreate an existing place at a specific time or date, while also making sunrise or sunset animations far more accurate. If the jungle in the screenshot above were a real place, it would be located near Jakarta, and the shot would have been taken on 1 July at 8:30 am.

For all artificial light sources there is a new library containing IES profiles, which determines how light is emitted from different sources. You can also assign physically accurate values, such as light temperature (Fluorescent, Incandescent, Halogen, Tungsten and so on) and light intensity to photometric lights.

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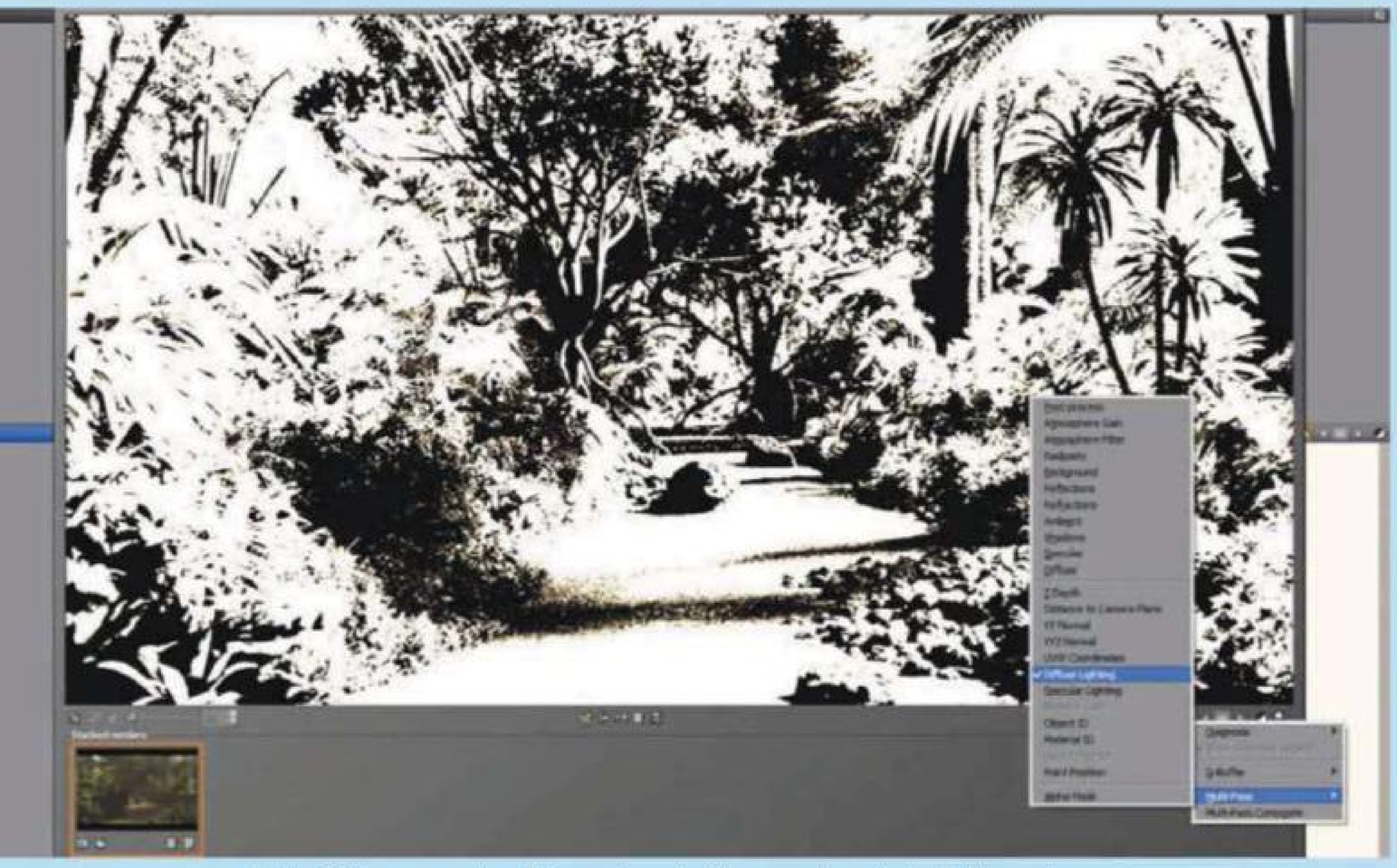

In Vue 2014, you can view all the render output layers you've selected in the render display window if you rendered your scene to screen

When ecosystem clumping is disabled, instances spread more evenly, which is pretty unnatural. Clumping is enabled on the second render, resulting in more variety in distribution and, as such, more realism

Besides these significant improvements in lighting, new features regarding Ecosystem and Vegetation also help you create even more realistic scenes. Ecosystem Clumping manages plants of the same species growing together in clumps, just as they would in a real ecosystem. Using the Clumping Amount and Average Clump Size sliders, you can easily control how this affects your scene.

Vue xStream 2014 is also compatible with all plants created in TPF (The Plant Factory), and you can load TPF plants without owning the software. Several published plant parameters of TPF plants, such as health and seasonality, can be animated directly inside the Vue timeline.

Several important new features have also been added to Vue xStream 2014 that make software integration with other 3D applications in a professional production pipeline much more convenient. Vue xStream 2014 supports the FBX format, meaning you can import FBX scenes including textured geometries and cameras. Camera motion can also be imported and exported in .FBX and NUKE .CHAN files.

When it comes to multi-pass rendering, Vue xStream 2014 is able to output all layers in a single multi-layered .EXR file, based on OpenEXR 2.0, an HDRI standard developed by Industrial Light & Magic. .EXR files can be imported into After Effects or NUKE, allowing for far more control over compositing and post-processing. An XYZ (or World Point Position) pass has also been included in the render output channels, which is commonly used in NUKE or After Effects for relighting or creating additional atmospheric effects. You can find a very useful tutorial on combining Vue's EXR output with NUKE's countless options at e-on Software's website: http://www.e-onsoftware.com.

There are many other improvements that have not been listed above, including Natural Grain, Small EcoSystem instance handling, Redesigned Function Editor and Perspective Camera. Considering all of these exciting new features, Vue xStream 2014 is definitely the number one choice for creating realistic, natural 3D environments. What's more, the software has now more firmly secured its place in the professional production pipeline.

Essential info

Price: £1,051.70 / $1,695 US*

www.e-onsoftware.com/products/vue/

OPERATING SYSTEMS

- Windows® 32/64 bits XP, Vista, Windows 7, 8 & 8.1
- Intel Mac OS X v10.6+ 32/64

OPTIMAL SYSTEM REQUIREMENTS**

- CPU: Multi-core: Intel i7, 4 physical cores or more (QuadCore is not enough for large productions)
- RAM: 4GB+ or 16 GB+ DDR3 for single-layer rendering, 32GB+ for multi-pass rendering
- Hard disk space: 10GB+ for single-layer still renders, at least 2TB for multi-pass renders and animations
- OpenGL accelerated GPU - supported boards/chips are listed at e-on's website (NVIDIA GTX or Quadro cards)

Reviewer's own suggested requirements. For official recommended requirements please visit e-onsoftware.com

There are great new features in the Atmosphere Editor's Sun tab. As well as real- world Sun position, you can choose custom Azimuth/Pitch positioning

The good & the bad

- ✓ Significant improvements in lighting and realistic ecosystem distribution
- ✓ Ability to handle very complex and detailed scenes
- ✓ Possibilities of integration into production pipelines
- ✓ Improved illumination caching
- ✓ Value for money, if used on a regular basis
- ✗ The particle system has not been improved
- ✗ Lights, rigs and morphs included in FBX scenes are still not supported
- ✗ Software unstable when Shader 4 enabled in complex scenes
- ✗ Photometric lighting causes slow render times

Our verdict

Features	9/10
Ease of use	9/10
Quality of results	8/10
Value for money	9/10

"New features and improvements make Vue xStream 2014 one of the best environment design tools available"

Final Score 9/10

*Price conversion correct at time of printing

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Storemags

Lumion 4.0

For architectural visualisation, Lumion 4.0 has found the sweet spot between simplicity and its powerful functions

REVIEW BY Jared Gorby, landscape designer

Working in Lumion, I feel like a master guitarist, striking every note with absolute precision, having spent my entire life mastering my craft. It feels this way because the program has revolutionised how to work and present ideas, and does so in a stress-free environment where it is incredibly easy to learn.

Everything is presented in real time, so there is much less trial and error compared to other programs that require previewing renders to see how adjustments have impacted your scene. This makes scene creation incredibly intuitive and faster than in any other software.

Many of the effects, such as the 3D grass, are as simple as clicking an on/off button. You can further customise the look by altering settings, such as blade size and height, and even add height variation to create naturalistic grasslands.

Other effects are just as easy to use. With the sun study option you can set your project location, date, and time, and leave the software to place the shadows for you. A two-point perspective feature also allows you to correct verticals with a simple switch.

Lumion 4.0 features a much improved and expanded SpeedTree plant library which, as a landscape designer, has become one of my favourite features. Genera such as pines, birches and maples are strikingly realistic, and the new flowers and shrubs substantially increase design capabilities. The new trees also come in a variety of shapes and sizes to fill in edge gaps on tree lines, or to create lush, layered planting plans. To boost realism, you can customise the colour of individual plants to create subtle variations. To finalise a tree, falling leaves that blow in the wind can be added with a single click from the special effects library.

All of these easy-to-use features are bundled into a visually simplified user interface that doesn't clog your screen. Features you are not currently using disappear into the interface, leaving more room to view your work.

Lumion has foregone traditional ray-traced renderings in favour of quicker rendering methods. Still, images typically take less than one minute, while videos take hours instead of days.

Lumion 4.0 is incredibly intuitive, with no visual clutter and a clear workflow. It has taken many of the usual hassles out of scene creation. With 4.0 you will spend less time creating graphics, and companies that once could not afford animations can now create them for even the smallest of projects.

Changing video effects with quick and easy feedback

Manipulating textures with immediate results

The Lumion editor displaying the real-time environment

Essential info

Price: Lumion 4.0
£1,258 / $2,063 US*
Lumion 4.0 PRO
£2,517 / $4,127 US*

www.lumion3d.com

OPERATING SYSTEMS

- 64-bit Windows Vista, 7 or 9

OPTIMAL SYSTEM REQUIREMENTS

- NVIDIA GeForce GTS 450 or ATI/AMD Radeon HD 4890 (minimum 1,500 PassMark points), with at least 1GB dedicated memory (not shared system memory)

The good & the bad

- ✓ Easy to learn
- ✓ Extremely stable
- ✓ Supports many file formats
- ✓ Extensive stock model and material library
- ✓ Helpful online documentation and support
- ✗ No raytracing
- ✗ No cloud-computing support
- ✗ Limited support for importing animations

Our verdict

Features	7/10
Ease of use	8/10
Quality of product	8/10
Value for money	7/10

"Quick, intuitive scene creation that is easy to learn"

Final Score 7/10

*Price conversion correct at time of printing

Much like in Toolbag 1, you are given many different options for lighting environments. You can also add dynamic lights for increased control

Marmoset Toolbag 2

A new version of Toolbag that promotes the latest industry standard practices at an affordable price

REVIEW BY Gavin Goulden, lead character artist, Irrational Games

Marmoset Toolbag 2 is a completely fresh start for the software, and a far more accessible tool that promotes modern-day workflows for current generation game art.

The main feature that sets it apart from other tools you may use is the promotion of a physically based rendering workflow. While this may be tough to understand at first, it is quickly becoming an industry standard for current generation titles. Marmoset Toolbag 2 makes it very easy to work with, without needing to build complex materials and environments on your own.

Materials have been totally revamped and greatly improved, to the point of matching high-end, formal game engines producing AAA titles today. As well as practically everything being changed under the hood, there are new features, such as subdivision per material, a new skin shader, and spec/gloss control to give you better results.

The lighting system has been reworked to use panoramic images as a light source, which you can now customise yourself. Toolbag 2 also offers the ability to control where the main light source and secondary light sources are located in these images, with the ability to tweak the values of these lights, including brightness, radius and shadow parameters. Along with these panoramic images, you can also add different types of dynamic lights to help punch the impact of your scene.

The user interface for Toolbag 2 has improved greatly, mimicking traditional 3D applications. Beyond just looking like a program that you may already be familiar with, scene management has been made much simpler. You can now add, remove, and manipulate separate objects to create a scene. Post-processing effects and settings are saved per camera, and you're still presented with an amazing suite of lighting environments to have your models up and running in minutes.

Toolbag 2 takes artist's needs into consideration. While it may not have the depth and complexity of formal game engines, or the ability to get under the hood and create materials from scratch, it offers an accessible, affordable tool that gives you better results in a fraction of the time. Toolbag 2 offers a great way to learn a physically accurate workflow, which will be new to most game artists considering how young the current generation is. However, it is fast becoming the industry standard and will be present in practically all AAA titles going forward. So, if you're a game artist looking to create quick and great-looking renders for your portfolio, the Marmoset Toolbag 2 is one of the best options out there.

MT2 supports real-time tessellation, adding density to your mesh for displacement info and smoother surfaces

Essential info

Price: £79 / $129 US*

www.marmoset.co/toolbag

OPERATING SYSTEMS

- Windows Vista SP2 (64-bit)
- OS X Mavericks 10.9

OPTIMAL SYSTEM REQUIREMENTS

- 4GB RAM
- Direct3D 11 GPU (GeForce 400, Radeon HD 5000)

Marmoset Toolbag offers a cheap, easy and powerful solution for current generation rendering, boasting a physically based rendering workflow and a user interface similar to popular 3D applications

The good & the bad

- ✓ Promotes a workflow that's fast becoming the standard
- ✓ Completely new material and lighting system
- ✓ Improved, straightforward UI
- ✓ New scene management like traditional 3D applications
- ✓ Fast mesh loading without the need for UVs
- ✗ Lighting setups not saved per environment
- ✗ Artefacts in renders that use transparency renders
- ✗ Cannot create custom shaders
- ✗ No two sided materials

Our verdict

Features	8/10
Ease of use	9/10
Quality of product	8/10
Value for money	9/10

"Toolbag 2 is the perfect tool for rendering real-time art using a modern workflow"

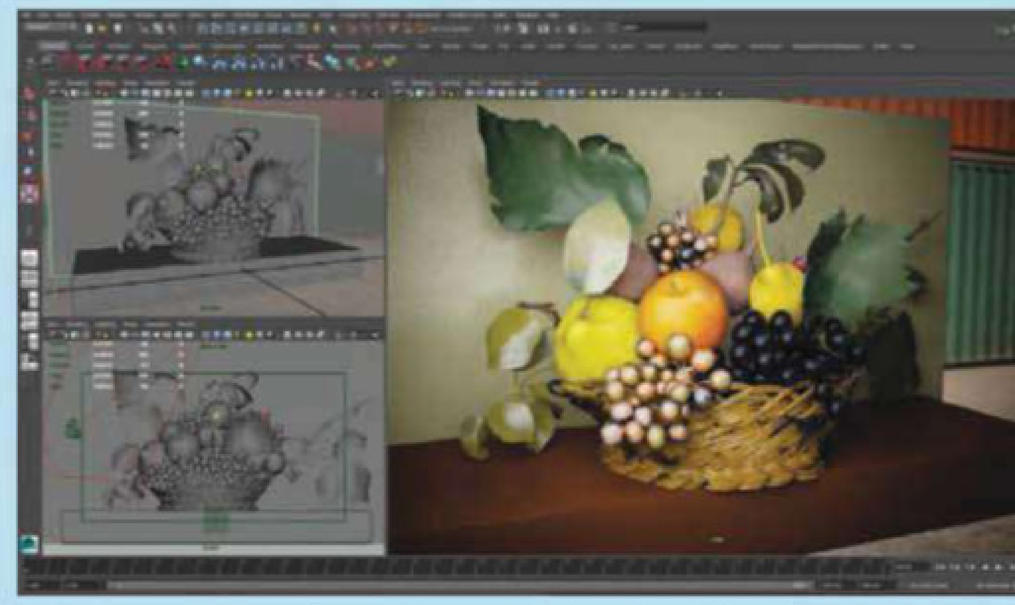
Final Score 9/10

*Price conversion correct at time of printing

Caustic Visualizer 1.3 for Maya

Jahirul Amin takes a look at Caustic Visualizer: a real-time raytracer for the Maya viewport

REVIEW BY Jahirul Amin, director/producer and associate lecturer at NCCA, UK



It's never been easier to get a quick and simple idea of what you final render will look like using the Maya viewport

I was lucky enough to be asked to review the latest update of the Caustic Visualizer for Autodesk Maya, and decided to kill two birds with one stone by testing out the Visualizer by creating a brief 3D homage to Caravaggio's Still Life with a Basket of Fruit. My test took the Visualizer through the stages of modelling, shading, lighting and rendering.

The Caustic Visualizer brings an interactive ray-tracer to Maya's viewport. The Visualizer gives instant feedback on what the final look of your work could be, accelerating your workflow. The Visualizer can also be used as the renderer for the final rendered images.

I found installation to be clean and quick. In terms of user-friendliness, for anyone accustomed to other render packages, you will be up and running without having to consult the manual. However, for those requiring the manual, it is very thorough and easy to follow.

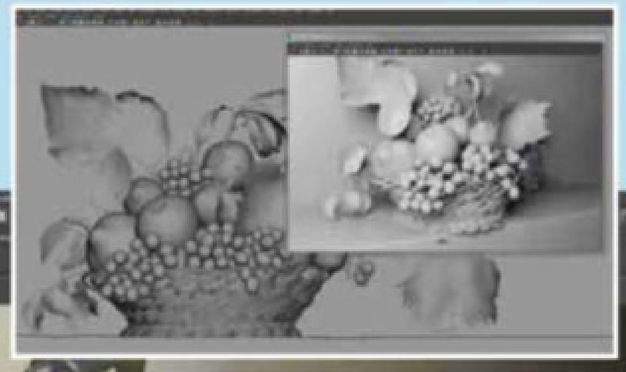
The difference the Visualizer can make was apparent right from the start, during the modelling stage of my project. The ray-traced image in the viewport reveals so much more, much more quickly, enabling you to correct any errors straight away.

An absolutely knock-out advantage to this bit of kit is that the Visualizer supports Maya shaders and most (although not all) mental ray shaders. You can also see the effects of HDRI in the viewport, with all of the reflections and refractions happening right there and then. The Visualizer makes the process of lighting and look development much more of an exact science than the usual, far more time-consuming, tweak-and-render approach. Clients needing a clear vision of how their idea will be realised can see it now, rather than tomorrow.

Furthermore, as the Visualizer viewport is not only a render view but also an active viewport, you can go on from modelling to use it for rigging, animating and lighting as you would your standard Maya viewport. Also, using the Visualizer to create playblasts (although, not officially supported) is effective in producing much clearer impressions of the final render. Additionally, the 1.3 update now supports batch rendering, allowing you to render not only stills but also image sequences. It also offers the option to add motion blur to your renders and depth of field direct to the viewport.

In a perfect world, it would be great to see the Visualizer be able to use the full range of mental ray shaders, especially the skin shaders, though I'm guessing the team at Caustic are already on to it. This slight misgiving aside, the Visualizer is an impressive tool which takes a lot of time-consuming, trial-and-error rendering out of the 3D workflow.

Using the Caustic Visualizer to aid in spotting any modelling issues



Taking advantage of the mental ray shaders and seeing the results instantaneously in the Maya viewport is very welcome

Essential info

Price: £180 / $295 US*

www.caustic.com/visualizer/maya/

OPERATING SYSTEMS

- Windows

OPTIMAL SYSTEM REQUIREMENTS

- Maya 2012 SP2, Maya 2013 SP2, Maya 2013 Extension 2 on Windows 7 and Windows 8 (x64 only), and Maya 2014
- System memory should be adequate to support your normal Maya use with scenes in your typical workflow. Use of the Caustic Visualizer will incur some additional system memory requirements, depending on the scene

The good & the bad

- ✓ Real-time viewport raytracing
- ✓ Speeds up lighting/look dev process
- ✓ Helpful documentation
- ✓ Well integrated into Maya
- ✓ View mental ray shaders in the Maya viewport
- ✗ A couple of crashes but nothing major
- ✗ It would be great to see the Misss shaders supported in future

Our verdict

Features	8/10
Ease of use	9/10
Quality of results	8/10
Value for money	9/10

"An impressive add-on to Maya that will speed up workflow and make the process more pleasurable"

Final Score 9/10

*Price conversion correct at time of printing

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WD My Cloud EX4

We put Western Digital's new four-bay personal cloud storage device to the test

REVIEW BY Larissa Mori, 3D Artist

The Western Digital My Cloud EX4 was designed for anyone to use, even those with no experience with storage devices. It aims to meet storage needs of small businesses and individuals in a user-friendly way, while maximising the protection of data from loss with optional RAID 1, 5, or 10 modes.

Instead of connecting to an individual machine, like other storage devices, the My Cloud EX4 connects to a wireless router to allow multiple users to access and share the content stored, even from across the other side of the world. The process of setting up and installing the storage device to do this is surprisingly simple: using the ethernet cable, power supply brick and power cord supplied in the box, we simply followed the clear instructions to attach the two cables, and the device was running within an hour.

The My Cloud EX4 is a highly modifiable device. From the start, potential customers have the ability to buy a driverless 0TB EX4 for £319 or an 8TB, 12TB, or 16TB version for £679, £799, and £999 respectively. Compatible drives can then be changed or added to the four-bay NAS using no tools in only minutes, and users can even attach two more USBs worth of storage devices.

To protect important data from being lost, WD has shipped the My Cloud EX4 with RAID 5 as standard, meaning that even if one of the four hard drives fails, there will be no data loss. This can then be modified to modes such as RAID 0, 1, or 10, giving more or fewer safety options. Dual power connections offer similar functionality – if one power supply fails, the EX4 can automatically switch to the other – but the second power cable would need to be purchased first.

WD has also put plenty of thought into making the sharing of data as simple as possible. The dashboard that allows access to the system from any browser also enables users to connect to the My Cloud EX4 on the move, simply by downloading the My Cloud mobile app from the same home network. Users who require access to the files on the storage device from another remote location will only need an internet connection and a browser to log in to their WD My Cloud accounts, or to use an emailed access code to communicate between their computer and the server, gaining access to their work as though they were on the same local network.

The app and remote connectivity options have their limitations, however. The speed of data moving between the remote computer and My Cloud EX4 depends on the speed of the internet at both sides. Also, when connecting to the EX4 from the app, users can only play the types of content natively supported from the mobile device. The My Cloud EX4 is slower during file transfer than some competitors, though with its 2.0 GHz processor and 512 MB of system memory it kept cool and quiet throughout and seems fast enough for most backup and storage uses, making it good value when considering its relatively inexpensive price.

Multiple options to secure data from loss include RAID 0, 1, 5, 10 or spanning and JBOD modes

The 8TB version of the My Cloud Storage has enough space for 1,600,000 photos or 615 hours of video, according to the website

My Cloud Storage EX4 options work right out of the box and feature WD Red hard drives

Essential info

Price: From £319 with no storage to £999 for 16TB (incl. VAT)

www.wdc.com

OPERATING SYSTEMS

- Windows 8, Windows 7, Windows Vista, Windows XP (SP3) operating system
- Mac OS X Mountain Lion, Lion and Snow Leopard operating systems
- DLNA/UPnP devices for streaming; Internet connection for remote access

TECHNICAL SPECIFICATIONS
(for the 8TB system reviewed)

- Interface: Gigabit Ethernet x2, USB 3.0 x2
- Dimensions: 208.60 x 220.20 x 160.1 mm
- Weight: 5.80 kg
- Operating temperature: -0° C to 35° C

The good & the bad

- ✓ Easy installation and setup
- ✓ Looks good, feels durable
- ✓ Two years' limited warranty
- ✓ Easy to modify and expand
- ✓ Compatible with both PCs with the WD SmartWare Pro software and integrated Apple Time Machine support for Macs
- ✗ Slower during file transfer than some competitors
- ✗ App media streaming dependent on what files are playable on the mobile device. Only supports browsing content by folder with no search function available

Our verdict

Features	7/10
Ease of use	8/10
Quality of build	8/10
Value for money	9/10

"A safe, durable and relatively inexpensive option for storing data"

Final Score 8/10

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StoreMags.com

The Cintiq Companion features a full HD, 13.3" wide-screen display, 2,048 levels of pen-pressure sensitivity, and the ability to detect the angle of your stroke

Wacom Cintiq Companion

Wacom's first mobile Cintiq combines features from a Windows 8 tab with a pro Wacom Cintiq Creative Display

REVIEW BY Larissa Mori, 3D Artist

The Cintiq Companion is a first for Wacom: a mobile tablet running Windows 8 designed to allow pro artists to create on the go.

The impressive spec that enabled the Cintiq Companion to run even 3D software on the device markedly smoothly does come at a price. The 256 GB SSD model is $1,999.00, and the 512 GB version is $2,499.00.

The Wacom Pro Pen boasts 2,048 levels of pressure. It combines a computer and Wacom tablet in one device, including multi-touch control and tilt sensitivity so the pen can be tilted like a real brush, and the software reflects the angle in a drawing.

The tablet looks inviting, with a stand that allows users to draw from a range of angles; a multi-touch, non-glossy surface; a storage case for the Pro Pen that includes individual place holds for the ten extra nibs and spare ring; and a soft case for portability of the tablet and pen holder. The whole package feels very robust and durable.

This tablet was designed with a focus on an artist's mobility, with a battery life that Wacom has stated will last up to five hours. It's aimed at 3D artists too, with the possibility for artists to create quick sketches on a Wacom-standard tablet in ZBrush, all while on the move. However, there are a few limitations. Created to function as a standalone mobile computer, the Companion cannot be used as a traditional accompaniment for software on a desktop workstation. If artists want to use a tablet on their workstations, they must invest in an additional tablet such as the Companion Hybrid. However, this runs on Android and will have limited application compatibilities as a standalone device. The Companion is also not designed to be opened and upgraded, and can't be recycled for use with a more up-to-date computer in the future.

It's also be less intuitive to work with the 3D software shortcuts that are easier to implement on a keyboard and mouse. That said, the Cintiq Companion does have eight customisable buttons and various on-screen customisable menus, and can be used with a wireless keyboard and mouse. Wacom sells a Bluetooth keyboard as an optional accessory.

Overall, this is an intriguing first foray into standalone mobile tablets for Wacom, and we are looking forward to seeing what other mobile devices the company creates next. Though aimed at a very specific target audience, if you're looking for a mobile tablet that runs software smoothly with a full HD screen, Wacom pressure sensitivity and the company's trusted name and reputation for building very high-quality, professional tablets, then you'll love the Cintiq Companion.

The Companion features customisable menus, and can connect with a wireless keyboard or mouse

Essential info

Price: From $1,999.00

www.wacom.com/CintiqCompanion/

OPERATING SYSTEMS

- Windows 8 or Windows 8 Pro

TECHNICAL SPECIFICATIONS

- Display Size: 13.3 inch
- Resolution: Full HD 1920 X 1080
- Storage: 256 or 512 GB solid-state drive (SSD)
- Size: 375 x 248 x 17 mm / 14.8 x 9.8 x 0.7 in
- Processor: Intel® Core™ i-7-3517U processor, 1.9 GHz
- Graphics Card: Intel® HD Graphics 4000
- Micro SD Slot: Yes
- RAM: 8 GB DDR3

Cintiq Companion was designed specifically for people in visual arts who need a professional solution to draw, sketch and paint when mobile

The good & the bad

- ✓ Full HD 1920 X 1080 resolution
- ✓ Impressive 2,048 levels of pressure sensitivity
- ✓ Multi-touch control and tilt sensitivity
- ✓ A mobile Wacom tablet, running Windows 8 – compatible with a variety of professional software
- ✗ Cannot be connected to another computer to function as a classic tablet
- ✗ No expandable memory
- ✗ High-end price

Our verdict

Features	8/10
Ease of use	7/10
Quality of build	9/10
Value for money	6/10

"An impressive piece of kit, but not for those who require desktop workstation compatibility"

Final Score 8/10

Storemags com

SpaceMouse Wireless

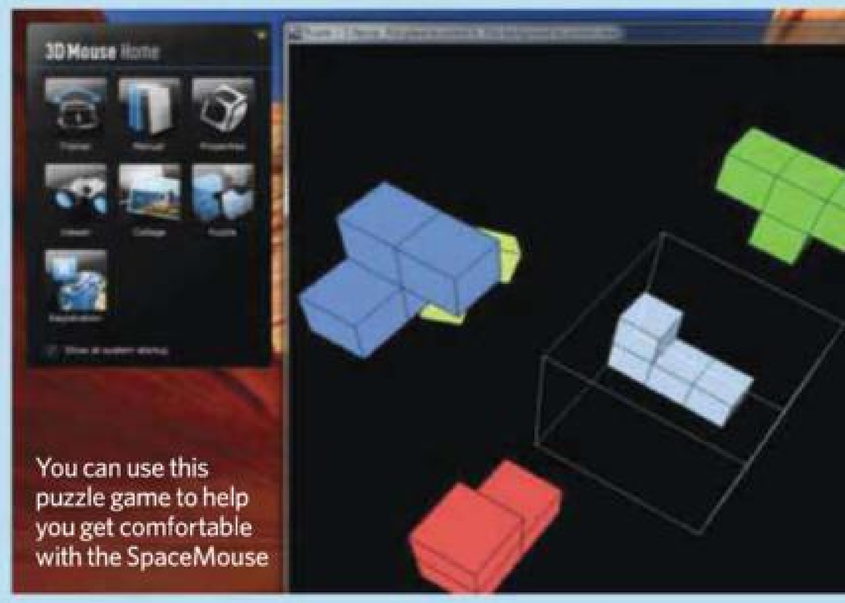
The world's first wireless 3D mouse has been unveiled by 3Dconnexion. Jahirul Amin takes it for a spin

REVIEW BY Jahirul Amin, director/producer and associate lecturer at NCCA, UK

A 3D mouse sounded a bit gimmicky, I thought, until I was handed this pretty little thing by 3Dconnexion. I installed the mouse's driver, loaded up Maya and tried it out for the first time. It made the experience of navigating in 3D space truly immersive, more so than you can ever experience through the usual point-and-click counterpart. The SpaceMouse creates a sensation that you are actually in the viewport with the assets, assessing them as if they were in front of you directly. As well as navigating the environment, you can select a single object and orient it in 3D space, which makes you feel a little like Tony Stark, just sadly without Dummy and J.A.R.V.I.S in the room.

So, how does it do all this? The SpaceMouse incorporates the same patented tech that goes into all the other products from the 3Dconnexion line-up: its 6-degrees-of-freedom (6dof). With this, you can zoom, pan and rotate with ease and, more importantly, do all of this simultaneously. You'll still need to use your usual mouse to point and click, which means the SpaceMouse is a device that works alongside its more boring counterpart, rather than replacing it. Ideally you'll have the SpaceMouse in your left hand and the usual mouse in your right hand, or vice versa if you're left-handed. No longer will you be using a keyboard modifier and the standard mouse to navigate the 3D viewport, but fluidly exploring the environment with movements and gestures, zooming and panning simultaneously.

The SpaceMouse also has two radial buttons on either side, enabling you to customise the mouse to your needs. I set these as the Shift and Ctrl keyboard modifiers, which reduced the amount of times I needed to head for the keyboard with my left hand. There are a couple of issues I have with this, however. First, the SpaceMouse doesn't work in certain windows such as the Graph Editor or the Hypershade in Maya, so I needed to resort back to using the regular mouse. Second, it would be great to see the SpaceMouse running in packages such as ZBrush. On the plus side, because the SpaceMouse setup is consistent from package to package, for the 3D software it does support (Maya, 3ds Max, Softimage, Rhino, Solidworks to name a few), navigation is the same regardless of which software you're using. On top of this, it works in a whole range of other pieces of kit such as Photoshop, Word and Firefox. Plus, did I mention, it's wireless? There you go, all your Christmases at once.



You can use this puzzle game to help you get comfortable with the SpaceMouse

The SpaceMouse Wireless next to the micro-USB receiver

Customising the radial buttons in Maya

Essential info

Price: £130 (including VAT)
$129 US

www.3dconnexion.com

OPERATING SYSTEMS

- Microsoft Windows, Linux and OS X

TECHNICAL SPECIFICATIONS

- 3Dconnexion six-degrees-of-freedom sensor
- 3Dconnexion 2.4GHz wireless technology
- Lithium-ion polymer battery (internal, rechargeable)
- Micro-USB connectivity (cable supplied)
- Simultaneous data and recharging
- Dimensions (LxWxH): 78x78x54mm / 3.1x3.1x2.1"
- Weight: 424g / 0.93lb

The good & the bad

- ✓ It's wireless!
- ✓ Completely changes the experience of navigating in a 3D viewport
- ✓ Great battery life
- ✓ Small, solid and sturdy
- ✓ One mouse to navigate in many packages
- ✗ Doesn't support some UI windows such as the Graph Editor
- ✗ No ZBrush support

Our verdict

Features	8/10
Ease of use	8/10
Quality of build	9/10
Value for money	8/10

"Overall a fantastic little product that makes navigating in a 3D viewport so much more immersive"

Final Score 8/10

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Samurai
Hasan Bajramovic

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Industry news

Full details on staff redundancies and protests at Pixar and DreamWorks, Blender's new UI team and more

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Cinesite

The director and producer behind Cinesite's first in-house animation short, 'Beans', tell us how the project was created

110 Industry insider

Tomasz Opasinski

We talk to Tomasz Opasinski to learn about his work designing posters for films such as *Oblivion* and *King Kong*

inside

> In this case, we decided we wanted to create something for ourselves
>
> **Eamonn Butler** Cinesite's animation director and producer of 'Beans'
> Page 108

Beans
Cinesite
The artists behind Cinesite's very first in-house animation tell us the story that saw the studio leap from a client service provider to original content developer

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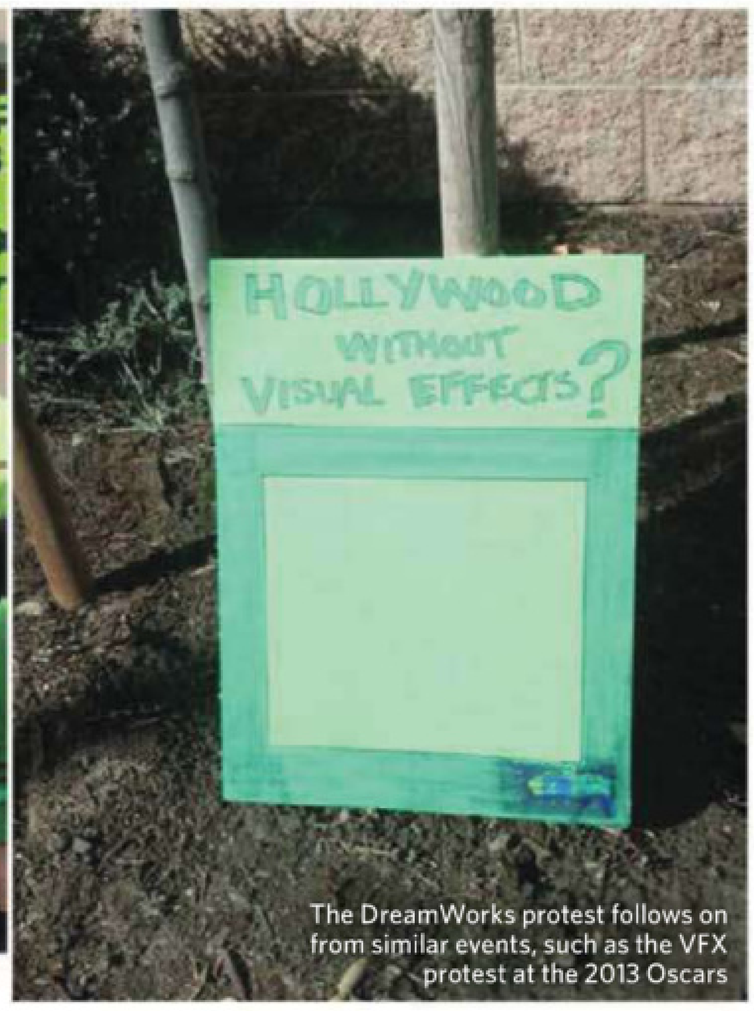

The DreamWorks protest follows on from similar events, such as the VFX protest at the 2013 Oscars

Dissent in the CG industry

It's all doom and gloom with job losses and protests at Pixar, DreamWorks and Rhythm & Hues

Around 60 members of staff working at Pixar's Emeryville, California, base will be losing their jobs, according to a report, due to delays on the studio's current film *The Good Dinosaur*. The animated feature, which is now being delayed by 18 months after the departure of director Bob Peterson in August, will result in 2014 being Pixar's first year without an annual release since 2005.

Interesting developments also occurred at DreamWorks this month, where California-based visual effects artists staged a protest during President Obama's visit to the studio. Frustrated at the outsourcing of jobs to foreign countries that offer subsidies, along with the lack of VFX work left in Los Angeles, the rally aimed to get hundreds of artists at the speech to wear the iconic green shirts that have come to illustrate VFX solidarity – representing the green screens audiences would be left looking at without the hard work of VFX artists.

"While VFX pros at the DreamWorks Glendale facility have fared better than their colleagues at Digital Domain, Sony Pictures, and Rhythm & Hues, they have seen a 15% drop in employment over the last year with 804 in 2012 down to 689 in 2013," stated a post on the VFX Soldier Blog, which both helped organise the event and reported on it.

There have also been updates on Rhythm & Hues losses in India, which unofficial sources have suggested amount to 103 employees – roughly 60 per cent of its workforce. Rhythm & Hues had filed for Chapter 11 bankruptcy protection on 11 February 2013, and was purchased a month later by Indian animation studio, Prana.

Dissatisfaction in the VFX industry has seen a significant increase in recent months, due to issues such as outsourcing of work to cheaper countries

Dynamic Shape Display

We take a look at the MIT tech that renders 3D content physically

Researchers from MIT, Daniel Leithinger, Sean Follmer, and Hiroshi Ishii, have showcased a new device that can render digital 3D content physically, allowing users to interact with digital information in a tangible way. The device, which they call the Dynamic Shape Display, can interact with the world around it by, for example, moving objects on its surface.

The researchers are currently exploring a number of applications for the inFORM shape display, which utilises a projector, Xbox Kinect sensor, about 900 pins, and a computer to move each pin up and down at a range of 100 millimetres to represent a real-life pixel. The projector is used to display colour on the top of each pin, and a Kinect is used to track gestures, objects and touches on the table.

Areas in which the display could be used is representing Geospatial data, such as maps, terrain models and architectural models, allowing architects to view 3D designs physically in order to better understand them without the need for 3D printing. Cross sections through Volumetric Data, such as medical CT scans, can be viewed physically in 3D and also interacted with. The team is hoping to explore medical or surgical simulation, and the possibility to remotely manipulate objects on a table.

You can view the tech in action at tinyurl.com/3DAinFORM

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To feature in workspace3D please contact Larissa Mori on 01202 586239 or larissa.mori@imagine-publishing.co.uk

storemags.com

Blender's new UI team

The Blender Foundation releases Blender 2.69

The Blender Foundation has announced that it is establishing a new UI team to work on improving the user experience for the free 3D software product, following the opening keynote of the Blender Conference 2013, where Blender Foundation chairman Ton Roosendaal gave his response to the online debate that was pushed forward when Blender Guru founder Andrew Price released a video discussing the UI failings.

Now, even Price himself is acting as a UI designer on the core team, along with lead developer of the software's Cycles renderer Brecht van Lommel and CG Cookie's Jonathan Williamson, along with five others. Everyone is invited to participate in the discussion of existing design tasks and propose solutions, with the ones that can be feasibly implemented in the near term being worked on by the UI team. All other designs and proposals, including those that turn out to be too big to be implemented, will be posed to the wiki.

Find out more about the new UI Team at http://developer.blender.org/project/view/12/.

© Blender Foundation – www.blender.org

Apple buys PrimeSense

Israeli 3D motion-detection company purchased

The company best known for having developed the gesture control for Microsoft's Kinect sensor has been bought by Apple for a fee some reports suggest is up to $360m.

PrimeSense technology is in over 20 million households worldwide, giving digital devices the ability to observe a scene in three dimensions and then translate the images it sees into information, a process PrimeSense has called depth sensing.

Earlier this year, PrimeSense unveiled the advances it had made in incorporating its technology in mobile devices. Apple had already filed a patent for new ways to control devices that do not involve physical contact, entitled Real Time Process Control Using Gestures, in October 2011.

PrimeSense technology gives digital devices the ability to observe a scene in three dimensions and then translate the images it sees into information

3D models from photos

New Delhi-based company announces Neitra 3D Pro

1. Exporting model from Neitra
2. Editing in Sculptris
3. Importing edited model to Neitra
4. Applying Texture to edited model

Users are now able to try Neitra's demo version with full features for 15 days or buy the full beta software for $700 at **http://www.triayaam.com/index.php/shop/**

The first piece of software released by TriAyaam, Neitra 3D Pro, allows users to create detailed 3D assets with photorealistic textures ready for 3D printing from a set of images alone, similar to AutoDesk's 123D Catch. Users can export models to external authoring tools like ZBrush, Sculptris or Maya to edit them further before importing them back into Neitra 3D.

"Neitra 3D Pro will introduce modellers to new realms," explains co-founder and CEO of TriAyaam Vision Labs, Gaurav Singh. "A modeller or hobbyist equipped with a camera has full freedom to capture anything for 3D reconstruction."

Software shorts

Bringing you the lowdown on product updates and launches

RenderMan Studio 18

Pixar Animation Studio has announced the release of RenderMan Studio 18, which includes features such as new controls for lighting, geometric area lights, and accelerated re-rendering powered by RenderMan's path tracer. RenderMan Studio 18 is compatible with Mac OS X, Windows and Linux, as well as Autodesk Maya versions 2013, 2013.5 and 2014. For more information please visit www.pixar.com

Octane Render 1.5

Otoy has revealed some early details of Octane Render 1.5, the next update to its GPU-based renderer. The preview of the upcoming release showcases support for the Alembic file format, which can be used to export the render of an animation to the cloud for much faster rendering times. Learn more at www.render.otoy.com/newsblog/

Experimental Houdini Engine plug-ins

Side Effects has announced that users of Autodesk Maya and the Unity editor will soon be able to access plug-ins to integrate Houdini technology. Available freely during the experimental testing period, the Houdini Engine includes access to all of the new Houdini 13 features. Find out more about the plug-ins at www.sidefx.com/

Sculpt digital clay

Leap Motion releases an app that allows users to sculpt digital clay with their hands

Impressively, Free Form is completely free. You can download it at **www.airspace.leapmotion.com/apps/freeform/osx**

After having released their highly anticipated gesture-tracking device to market several months ago in the form of their Leap Motion Controller, Leap Motion has now unveiled Free Form, which allows users to sculpt 3D models using their own hands.

Key features include the ability to choose from a range of sculpting tools and brush styles, materials, and environment types. Users of Free Form are able to view their creation's wireframes, and export projects as .ply, .stl or .obj files to import into another 3D application.

DID YOU KNOW? • Google has started inviting developers to buy Google Glass's Explorer Edition

Project Focus

Beans

The artists behind Cinesite's first in-house animation tell us the story behind the studio's leap from client service provider to original content developer

CINESITE VISUAL EFFECTS

Project 'Beans'
Description A team of astronauts are exploring the moon when they are suddenly attacked by a monstrous alien, an alien they have rudely disturbed.
Company Cinesite
Country UK
Bio Based in the heart of Soho, London, Cinesite has been creating world-class visual effects for nearly 20 years. From Bond films to *Harry Potter*, from *Underdog* to *World War Z*, it has been central to the success of a wide variety of projects. It has also been successful in television, winning an Emmy award and a Royal Television Society award for outstanding work.
Website www.cinesite.com

Alvise Avati still can't believe his luck. Less than a year ago, he had been working as an animator at Cinesite when he had the idea for his next short. Little did he know that for the next seven months, this idea would change his life.

Avati was no stranger to the process of creating his own film; he had already written, directed and animated several shorts in the past, painstakingly producing them during any free time he had after work. The plan was to make this next project in very much the same way, but just before he began, Avati decided to show his animatic to Eamonn Butler, Cinesite's animation director, in order to see what he thought. To his surprise, Butler suggested he create the film as a director at the Emmy award-winning VFX studio itself.

The move was certainly a first for Cinesite, marking the only animated short produced entirely in-house that the company has ever created. Butler, however, assures us that taking advantage of all that in-house talent to make proprietary work is something the company has been interested in for a long while. "My background is at Disney; I was there for 10 years doing feature animation, and I missed being involved at the front end and coming up with the ideas," he explains.

The animation, created in the style of a fast-paced commercial and teasingly entitled 'Beans', tells the story of a team of astronauts exploring the moon, who are suddenly attacked by a monstrous alien that they have unfortunately disturbed. "The thing I liked best from the point of view of an animator was the idea of seeing these tiny astronauts moving really slowly, and a huge monster moving really fast," explains Avati. "Usually, when you want to give a giant monster more weight in animation, you make it move more slowly, and in theory the more slowly it moves the more weight it has. Here it was the opposite, because we wanted the audience to understand that the monster belonged to the moon environment and therefore could move easily through it, whereas the astronauts could not."

After watching – and laughing throughout – Avati's comic animatic, Butler knew the idea would also be perfect for another one of his goals within Cinesite: to develop an impressive creature reel. It even offered the advantage of allowing artists the freedom to showcase their most up-to-date work, without needing to wait for a film to be released first. "We were all very excited about it," enthuses Butler. "Normally we come in at the end of somebody's schedule and help them get some cool visuals, but in this case we decided that we wanted to create something for ourselves. It kind of feels like a natural thing for us to be doing, going from being a client service provider to developing content."

After working together on 'Beans' for seven months, throughout their weekends and on time away from other projects, Avati, Butler and the rest of the core

> "It feels like a natural thing to be going from being a client service provider to developing content"
> **Eamonn Butler,** Cinesite's Animation Director and Producer of *Beans*

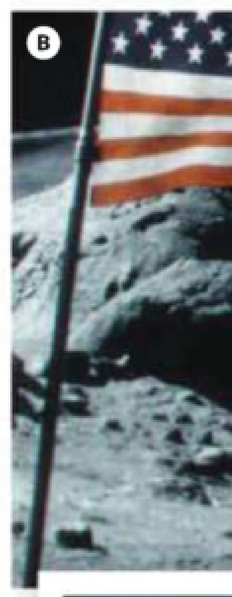
Contributors

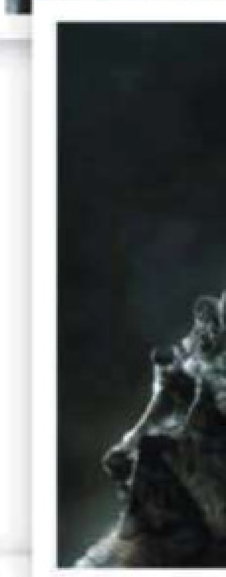
Eamonn Butler
Cinesite's Animation Director and Producer of Beans
Alvize Avati
Director and Writer of *Beans*

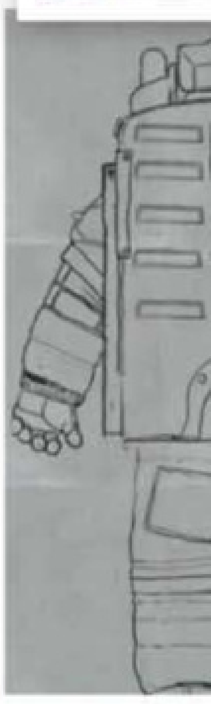
Portfolio highlights

Some recent features that Cinesite has worked on:

2013 *World War Z*
2013 *Iron Man 3*
2012 *Skyfall*
2012 *John Carter of Mars*
2011 *Pirates of the Caribbean: On Stranger Tides*
2010 *Harry Potter and the Deathly Hallows: Part 1*





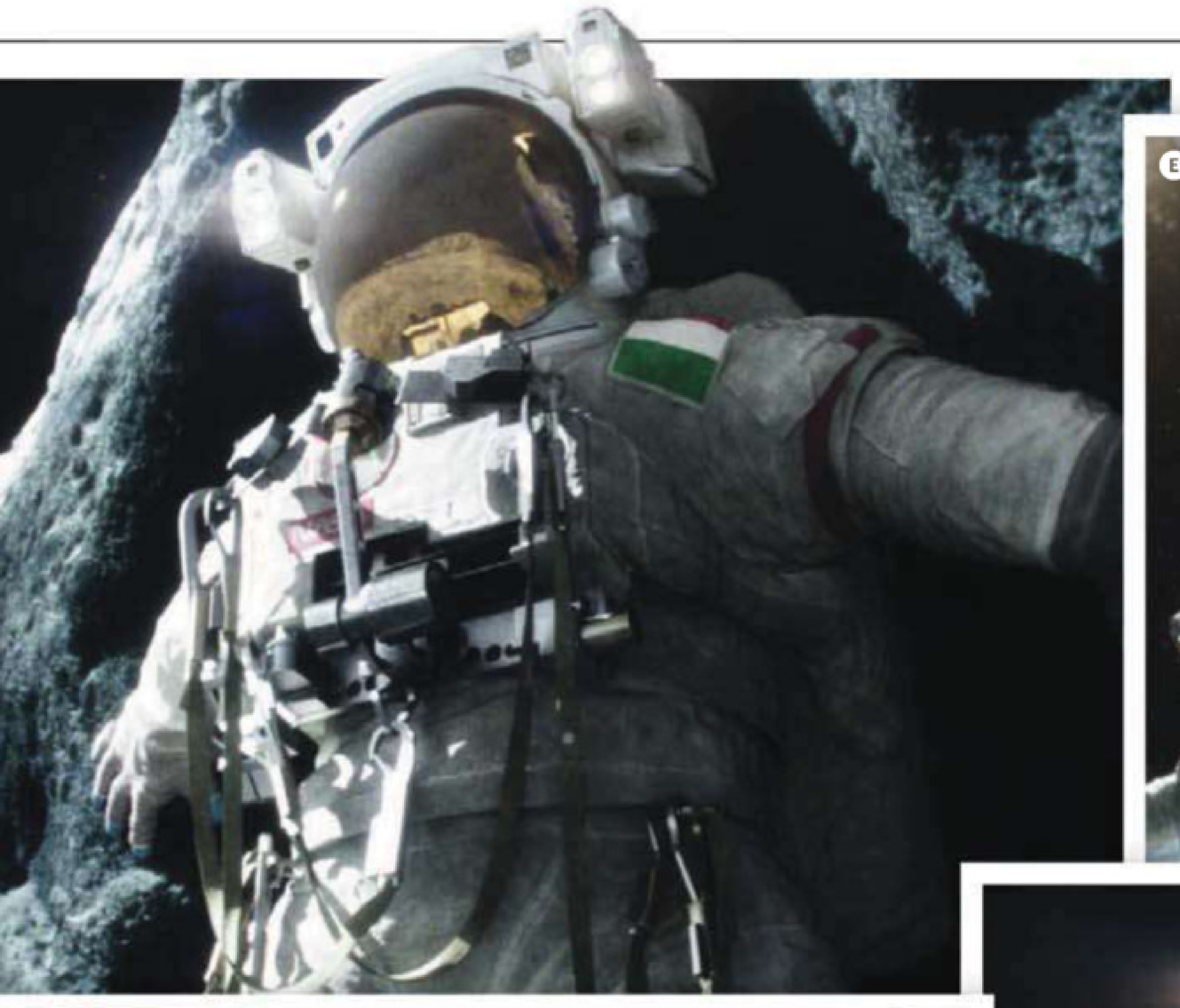


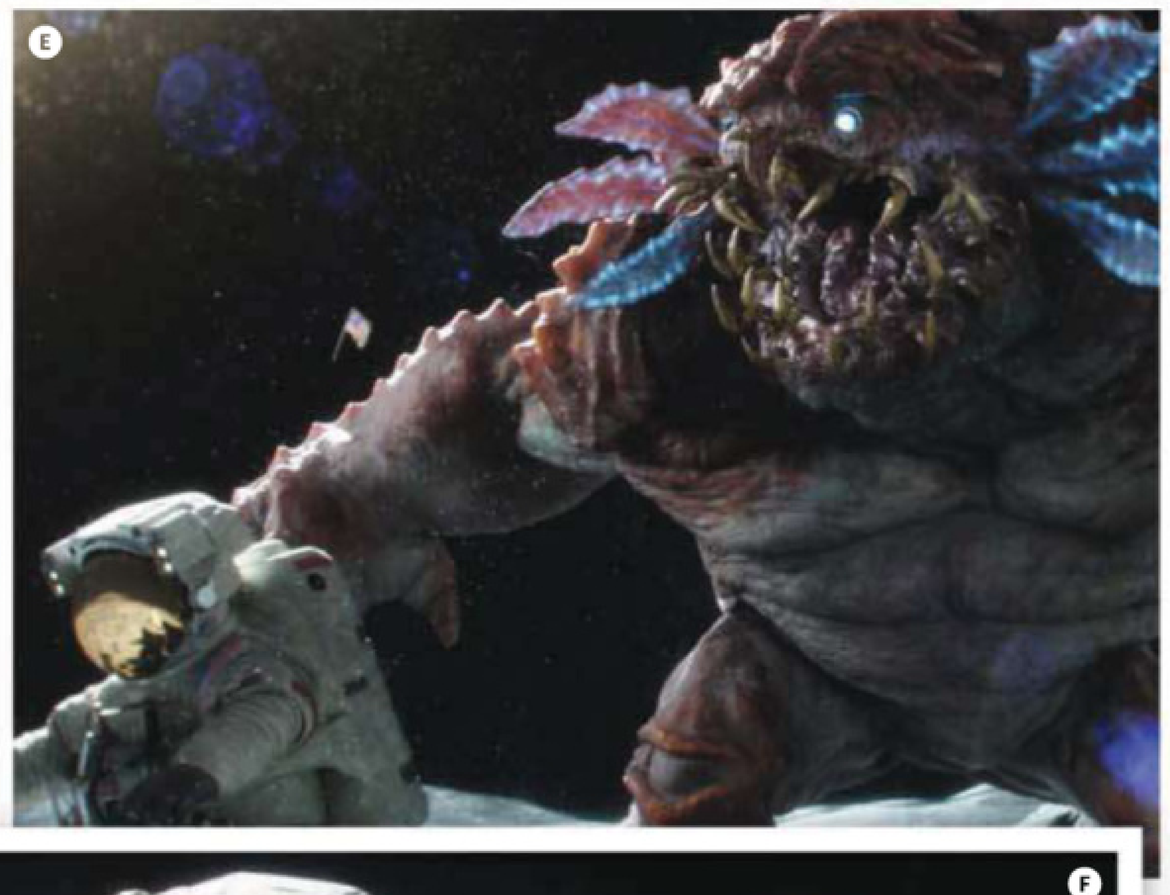
A "I wanted us to make our own content, and that is ultimately where I would like us to go as part of the portfolio of services that we offer. I do not want it to just be about visual effects; I want it to be about content creation too," says Cinesite's Butler

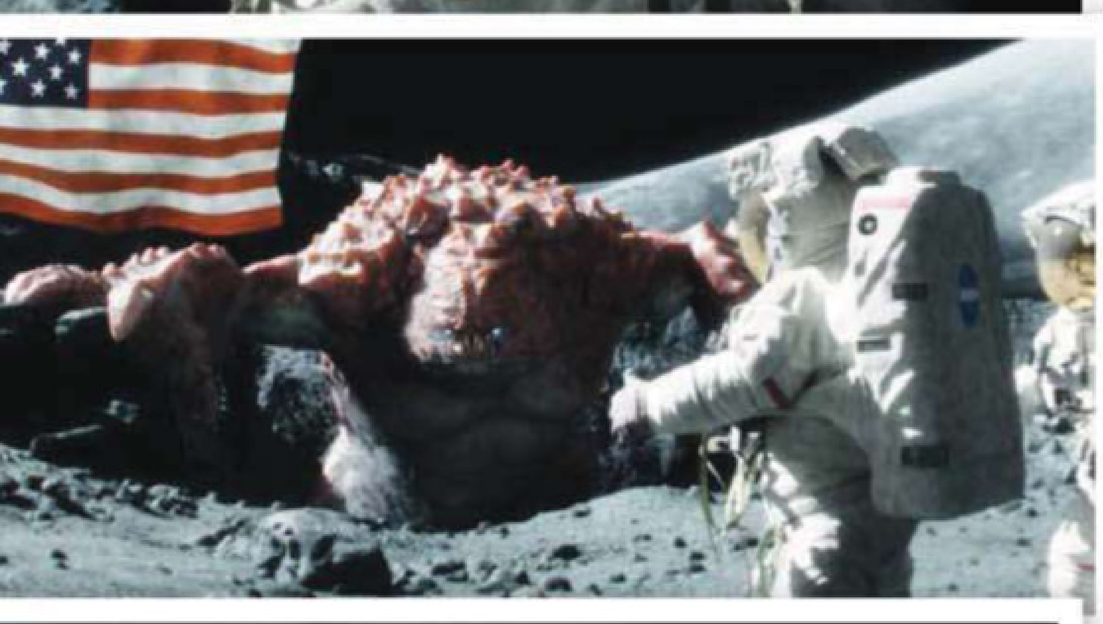
B Initially intended as a personal project, Avati purposefully designed everything to be as simple and achievable as possible. He avoided such assets as complex human forms, flowing hair, or any kind of cloth simulation

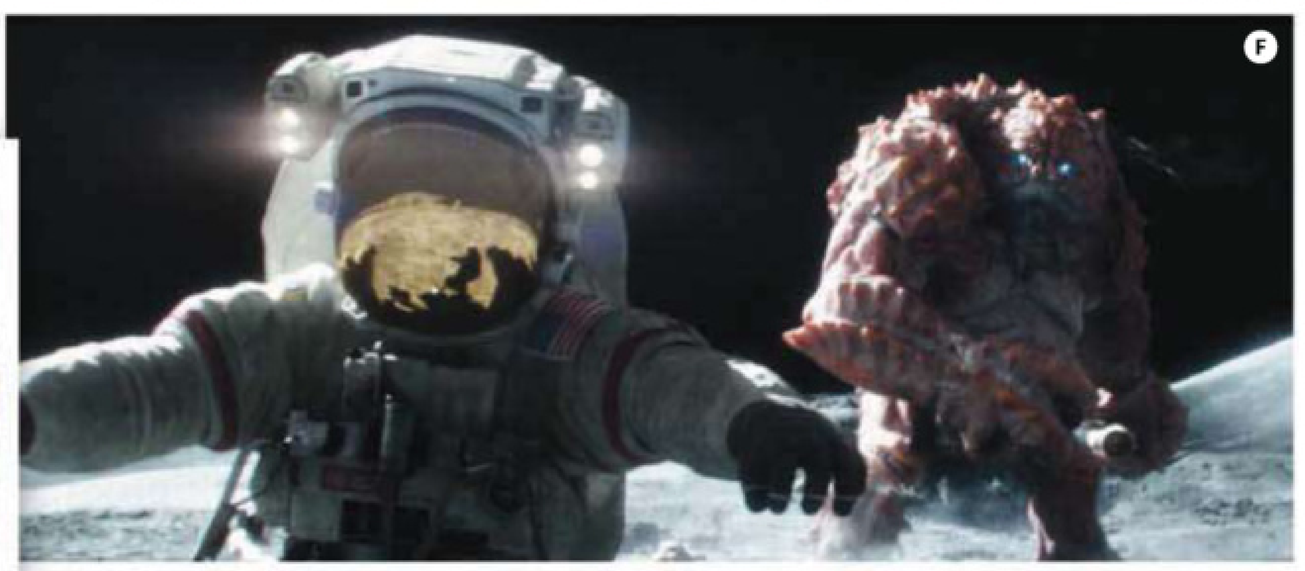
C Cinesite has worked on plenty of creature work in the past, having created giant scorpions, photoreal cheetah ghostly deer, battle hardened aliens and more. 'Beans' has provided the company with just one more imaginative creature to add to its reel

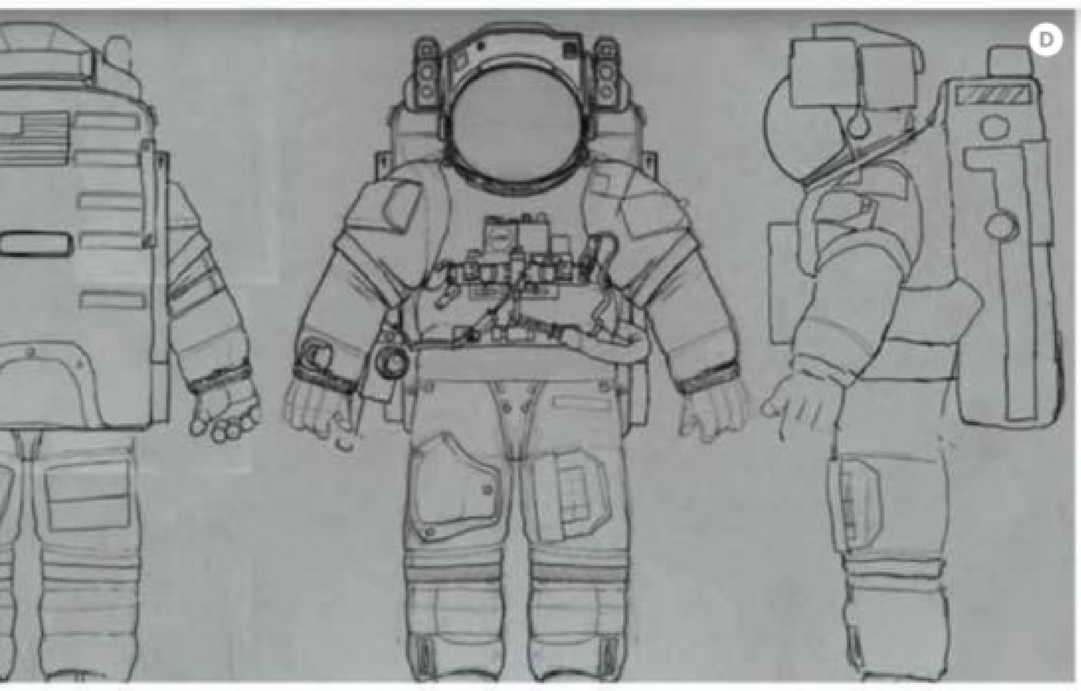
To submit your project to the **workspace**[3D] please contact Larissa Mori at **larissa.mori@imagine-publishing.co.uk**











The importance of photorealism

For Avati and Butler, who were initially the only two artists working on the film, the need to create photorealistic imagery was crucial in selling the short's comedy

"We're in the business of photorealism as a company, and I thought we should leverage off that as we've got lots of amazingly talented people that can pull off lots of sophisticated imagery," explains Butler. "Playing up the reality of the first few seconds of the film and truly placing the audience on the moon circa the Sixties, before flipping that idea on its head when the giant space monster shows up, makes it funnier for me. It takes a really funny idea and makes it really, really epic too."

team of only eight artists now need to wait for the final grading and music to be added before the short is complete. "You know, when it's fun you don't even notice the time," says Butler. "Everybody had a say, everybody could contribute to it. One of the only difficult things was fitting it around all the other movies. It made it difficult to schedule it, but if this is successful and people like it, and it brings us work, we definitely want to do at least one every year."

"It was amazing. It was like a dream!" beams a happy Avati. He and Butler are already thinking about what to do for their next project. "Every morning I would wake up and say to myself: Alvise, you are very lucky. It won't last forever, so make sure you enjoy every moment, and I really did."

D For Alvize Avati, being a director was in his blood. His whole family is in the film industry, and his father had directed 45 films throughout his entire career. Avati is now working on the upcoming feature film *Hercules* at Double Negative

E Eamonn Butler explains that UK tax breaks for animation were a truly massive help in bringing 'Beans' to fruition. The team at Cinesite is pushing for more shorts in future, and they are currently deciding what to do next, out of five or six possible ideas

F "I don't know why I showed Eamonn the animatic. I didn't think doing it with Cinesite would even be a possibility!" says Avati. He advises other animators to try for every opportunity. "It doesn't cost anything to try. At worst they'll just say no."

Industry insider

Tomasz Opasinski

Entertainment advertising creative director and digital artist

We talk to Tomasz Opasinski to learn more about his ingenious CG poster work, imaginatively inspired by such feature films as Oblivion and King Kong

About the insider

Job Entertainment advertising creative director & digital artist

Company website www.tomasz-opasinski.com

Biography Born and raised in Poland, a new job (and curiosity) brought Opasinski to the United States 12 years ago. Since then, he's been designing and co-producing various advertising campaigns for the entertainment industry, from theatrical to broadcast and gaming.

For some time, CGI has been used to create the stunning characters, environments and explosions that audiences are wowed by in film VFX every day. Perhaps less noticeable, however, is the fact that 3D has become increasingly prominent – not solely within the production of the films themselves – but also in the posters that advertise them.

Artists creating these posters have truly embraced 3D, such as entertainment advertising creative director Tomasz Opasinski, who has been designing and co-producing advertising campaigns – like his recent work creating *Oblivion*'s poster – for more than a decade. "My industry only recently embraced the use of 3D. Several years ago, no one thought of using it," explains Opasinski. "It all started with title treatments and some set extensions, and then moved on to full-on comping in 3D for recent CGI-heavy productions. There were not many people to learn from 12 years ago, so I had to learn all by myself, probably making a lot of mistakes on the way."

Despite this challenging start, Opasinski has since been involved in an impressive 400 campaigns, including everything from theatre and film to games. He's even begun to use his multitude of experience to offer workshops, teaching others the benefits of using 3D tools within their work.

What is the ideal movie poster, and what inspires you to design them both in your free time and as a professional career?

I think that a good poster is based on a metaphor where a single image represents the movie in a simple way. I always describe a poster as an actress on the stage who wears heavy theatrical make-up so that her facial expressions are clear – it has to be slightly exaggerated for us viewers to understand what may happen in the film and also intrigue us a bit. If I can get this from the poster, that's another ticket sold. My inspiration was – and still is – one simple thing: passion. I think passion can inspire you more than 20 museums and five galleries put together.

Why did you first decide to start creating your designs in 3D?

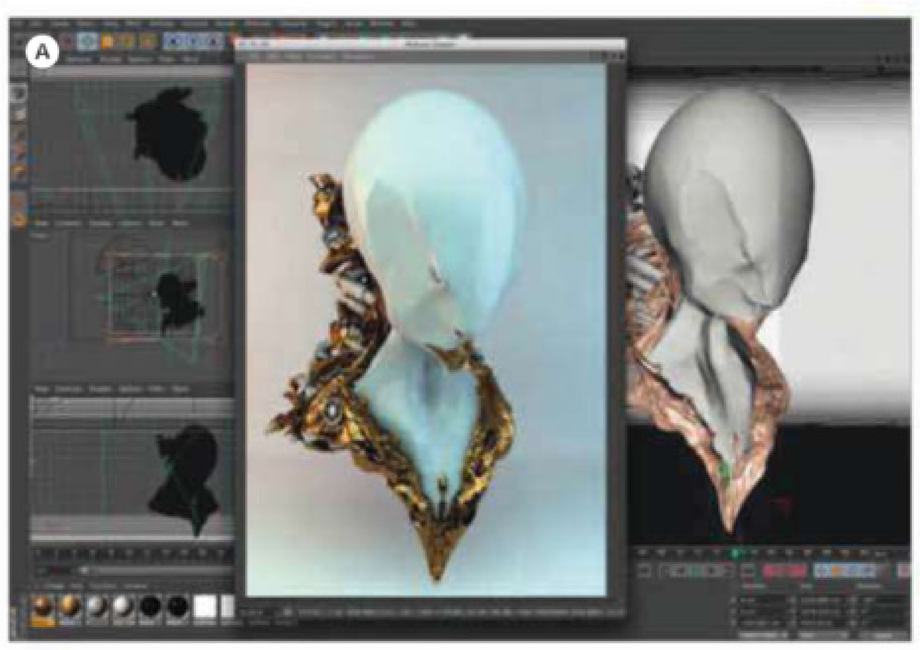
It was an obvious choice at a certain point in my career. Once I design something in 3D, I can quickly reuse it to revise a poster. For example, I can compose a slightly different angle of the same scene without redrawing it photorealistically. It saves time and money in the end. Once built, a scene can be re-lit, re-textured and re-composited as many times as required.

What's your workflow when creating a film poster such as these in 3D?

For my personal posters, I start with my poster template in Photoshop. I sketch my initial idea to see where the title and typography could go, then I'm off to ZBrush or CINEMA 4D where I quickly block out what I see in my head. Then comes my so-called reality check, where I estimate whether I should doodle for around 10 hours in ZBrush or fake elements in minutes within Photoshop. Once this phase is complete, I detail my work, keeping in mind that the message is the most important element. Lighting, texturing and simple cameras are then set, before it's time to render it once or twice at high resolution. For print, CINEMA 4D is actually great for large renders.

Once the renders are done, it's compositing time. I'm back in Photoshop merging, blending, adjusting colours and transforming these raw 3D elements. Whoever invented Alpha channels is my hero!

Things are slightly different when it comes to commercial work, where I have to design something that 20 people imagined together. Usually, I have far less time to doodle.



Portfolio highlights

Some recent features that Tomasz Opasinski has worked on:

2013 *Oblivion*
2013 *Percy Jackson: Sea of Monsters*
2012 *Jack the Giant Slayer*
2011 *Game of Thrones*
2011 *Rage*
2006-2009 *Harry Potter*
2008 *The Dark Knight*
2007 *Resident Evil: Extinction*
2004 *King Kong*

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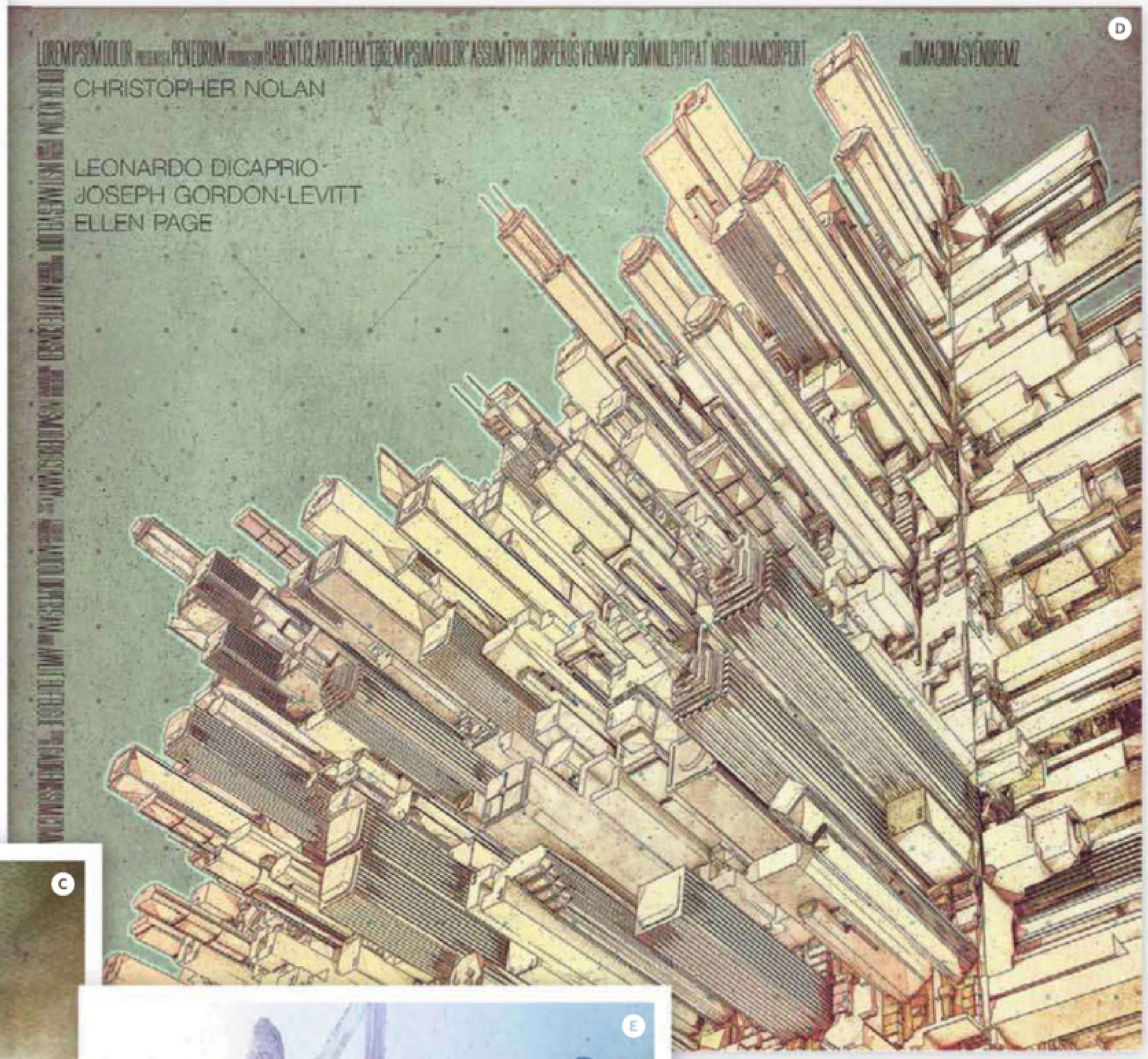


All images © Tomasz Opasinski

Subliminal impressions

Opasinski explains why his recent poster for Joseph Kosinski's *Oblivion* is one of the projects he's most proud of having worked on

"It might look rather simple, but it hits your eye in a very subliminal way. You know that something is off in Tom Cruise's world, but you don't exactly know what. The bridge is tilted on purpose, as if it was a wilted plant or a very sad person. This element, in juxtaposition with Tom's silhouette – that's the story."

> "I think passion can inspire you more than 20 museums and five galleries put together"

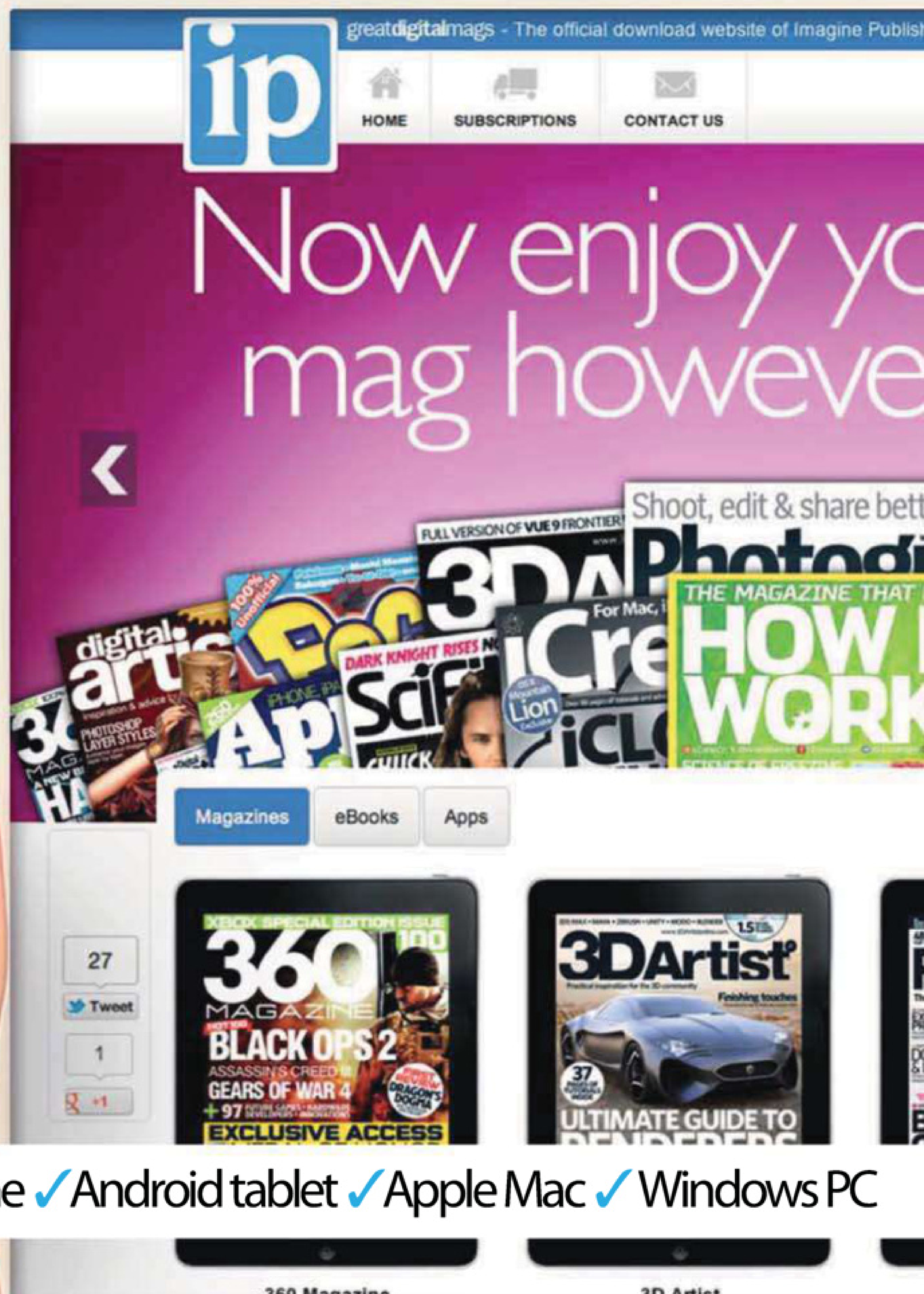
A The standard tools Tomasz Opasinski uses when creating posters include a Wacom tablet, Photoshop, Illustrator, CINEMA 4D and Pixologic ZBrush

B "Every project I've worked on had challenges – if not at the early stage, then at the absolute end of it. It's just entertainment's nature," says Opasinski

C For Opasinski, the ideal poster does not have to be complicated at all, but it does need to offer viewers a clear, intriguing message of what the film entails

D Opasinski began working in 3D with Caligari TrueSpace years ago, before settling on CINEMA 4D due to its ease of use and short rendering time capabilities

E "Clients are restrictive. When you create for your own amusement, you are limited only by your imagination or knowledge of your tools," explains Opasinski



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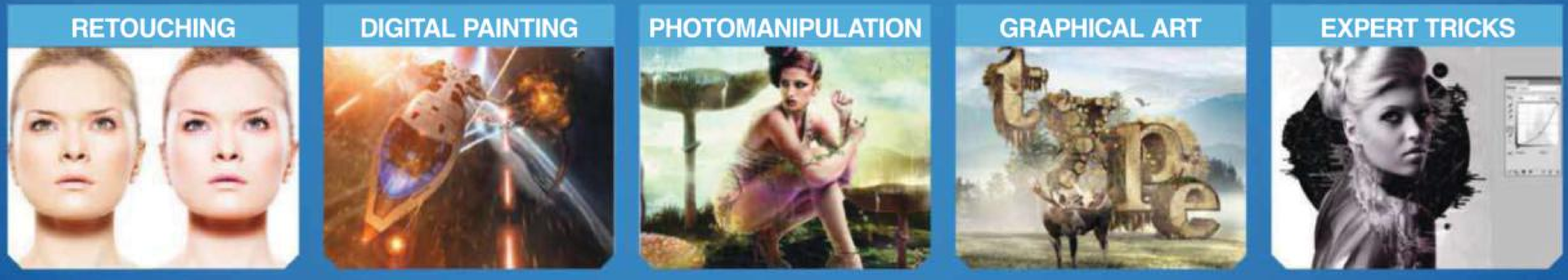

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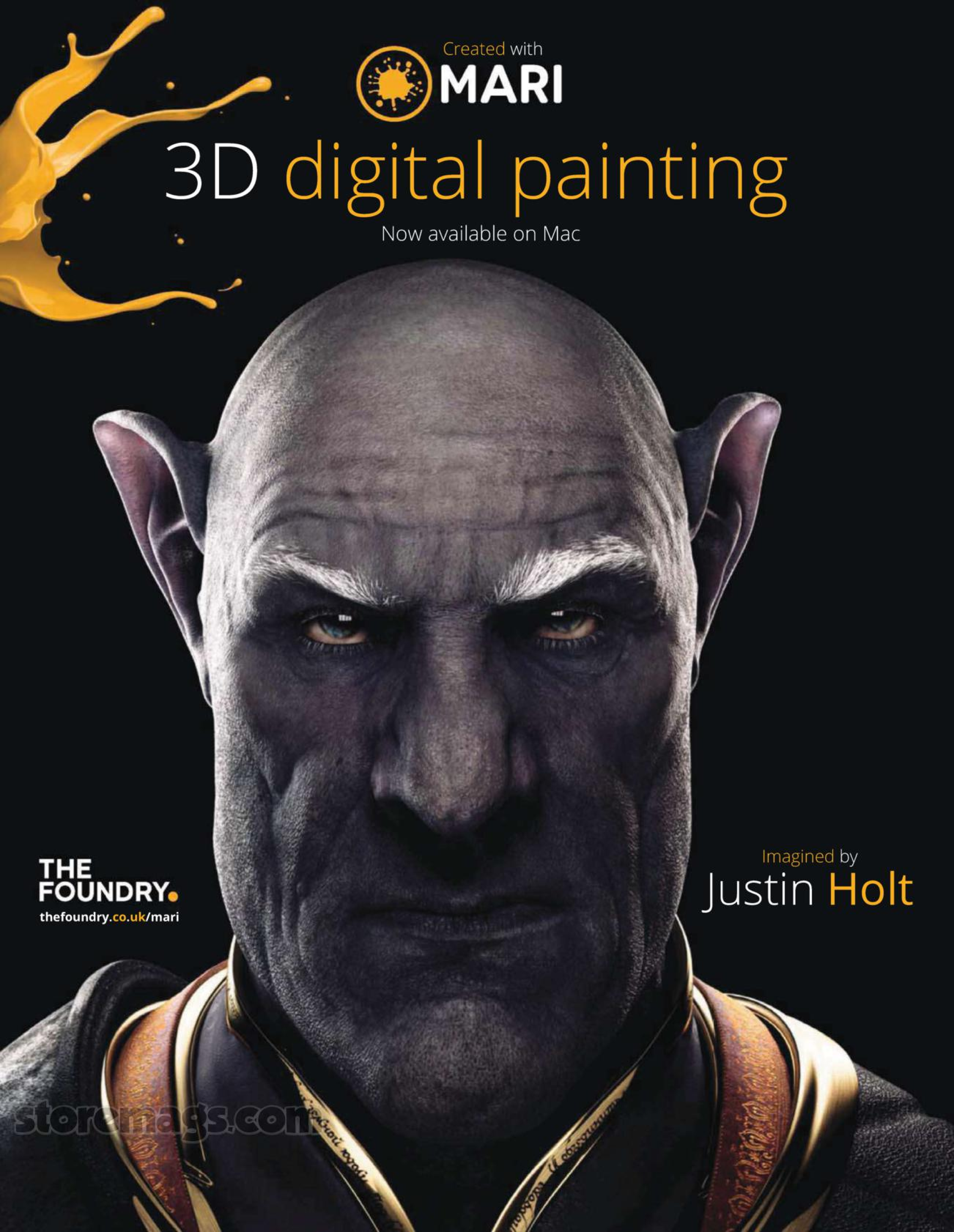

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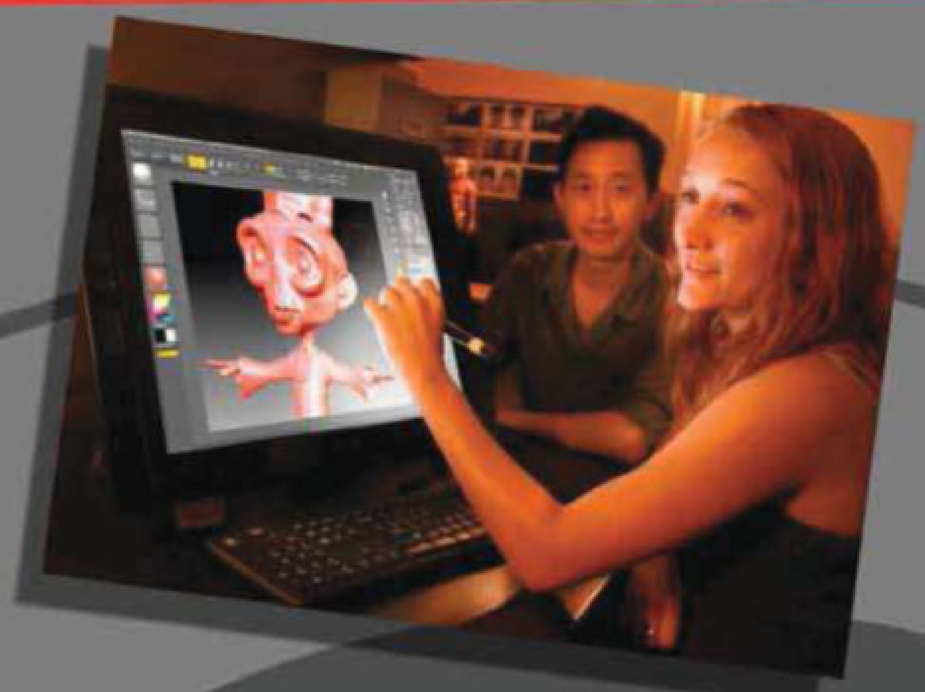

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